

"We begin our investigation of Taiwan's economy with agriculture because the majority of the population are occupied in this field. First, let us examine the area under cultivation. In considering the figures given below, one should bear in mind the following fact: in Taiwan, as in other southern regions, in many cases two and even three crops a year are taken from the same field, and thus a distinction should be made between cultivated area and crop area. If each field produced two crops a year, then the total crop area would be double that of the cultivated area. Double cropping usually takes place on irrigated fields, although, if rainfall is evenly distributed from month to month, even dry fields can yield two crops. The growth of total cultivated area of Taiwan and of its irrigated area is shown in the following table: [42]

Cultivated Area Of Taiwan

(1,000 ko) (1)

1. Ko (in mandarin Chinese chia) is a local measure of area equal to 2.377 acres or 0.961 hectare.

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Cultivated Area Of Taiwan [Cont.]

	Paddy fields producing one crop	Paddy fields producing two crops	Total paddy fields	Dry fields	Total
1900	...	...	200.7	157.5	358.2
1904	...	...	312.6	332.1	644.7
1909	...	...	337.8	344.7	682.5
1911	...	...	346.4	364.9	711.3
1916	...	...	358.8	379.7	738.4
1923	261.5	115.3	376.8	398.6	775.4
1933	313.1	147.4	450.5	395.0	845.5
1934	320.0	142.9	462.9	388.4	851.3
1935	322.2	141.3	463.5	363.2	856.8
1936	327.4	206.4	533.8	338.4	872.3
1937	332.3	212.1	544.4	338.8	883.3
1938	331.8	211.4	543.2	341.2	884.4

Source: for 1900. Nogyo nenkan, 1937; for 1938, Taiwan Jijo, p. 456.

The population of Taiwan is growing rapidly, and its agricultural population is very large. Under these conditions an increase of area under cultivation should be recognized as significant, and if the figures given above are correct, the cultivated area increased

116, 241, 311

2.47 times in thirty-eight years—a remarkable advance. But if we examine the figures, we find that between 1900 and 1909 the cultivated area increased from 358,200 ko to 682,500 ko, or by 36,033 ko every year, while between 1909 and 1938 the increase was from 682,500 ko to 884,000 ko, or only 6,940 ko every year. The greatest expansion therefore took place when the government did not even have complete control of the island, and only in 1908 did the administration work out a comprehensive scheme of irrigation. The explanation of this striking initial increase would appear to be that between 1900 and 1909 the Japanese government made a complete survey of Taiwan, and many lands were recorded which formerly did not appear in the official figures. "

116, 161, 178, 241

"The average increase of area under cultivation by 7,000 ko each year must be compared with the annual increase of the population of 130,000 to 140,000 persons; for each ko increase in cultivated land there is an increase of twenty persons. It is thus quite evident that the increase of cultivated area is lagging behind the increase of population. The same idea may be expressed in another way: since 1904 the population of Taiwan increased 1.92 times. whereas the cultivated area increased only 1.37 times.

Improvement in the situation may be brought about (1) by cultivating areas now uncultivated; (2) by turning areas now producing one crop into double-crop areas chiefly through irrigation; (3) by increasing yields and substituting crops bringing high income per unit of area for crops bringing low income; (4) by shifting the population from agriculture to industry and importing foodstuffs to feed the growing population. Let us now consider these possibilities in turn, with the exception of the fourth, which will be examined later. "

"(2) Irrigation combined with double cropping is another [45] way of increasing agricultural production. In 1937 one ko of dry field produced on the average eight koku of rice, while one ko of paddy yielded 14.9 koku in one crop or, where two crops were possible, 28.1 koku. (1) Irrigation almost doubles the crop while irrigation and double cropping

1. Figures are taken from Nogyo nenkan, 1939-40, pp. 647-648.

combined increase the yield three and a half times.

Data on the increase of irrigated area and of double-crop area were given in the preceding table. [See p. 42, category 116--analyst] Here we may point out that while in 1909 only 49.5 per cent of the total cultivated land was in paddy fields, in 1937 paddy fields accounted for 61.6 per cent of the total and, according to the same table, 37.6 per cent of the total cultivated area was yielding two crops. If this is true, then the crop area should equal 137.6 per cent of the cultivated area but in the official sources for 1937 the total area of all crops amounts to only 1,120,400 ko or 127 per cent of the cultivated area. A possible explanation of this divergence is that ten per cent of the area was fallow or growing green manure, but this is hardly probable."

4:Grajdanzev--45-46
116, 241, 651, 661, 177.24
636.24

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(no date) 1942

Formosans
Japan

"Beneficial as these irrigation works are, in many cases they curtail the farmer's freedom to select his crops. The government often compels the farmers to raise crops which they do not want to raise (as, for example, sugar cane). Takahashi tries hard to prove that this compulsion, which in Taiwan is [46] called simply exploitation (sakushu), is to their benefit, (1) but his arguments are not convincing.

1. Takahashi, op. cit., p. 280."

4:Grajdanzev--46-47 S-4
116, 171, 241, 454, 433, 177.24
 636.24

(no date) 1942

Formosans-1-3
 Japan

"(3) Increased agricultural production may also be achieved by raising yields per unit of area. Below we give a comparison of yields in Taiwan and in Japan, and in the case of sugar cane, the area of which in Japan is too small, a comparison with Hawaii and the Netherlands Indies, where conditions are similar to those in Taiwan, while groundnut production in Taiwan is compared to that of Mantung.

Crop Yields In Quintals Per Hectare in Taiwan
 and Other Countries.

		1928-32 average	1933-37 average	1937
Wheat	Taiwan	8.7	9.7	10.7
	Japan	17.7	19.1	19.1
Barley	Taiwan	6.4	8.0	7.4
	Japan	19.9	20.6	20.9
Maize	Taiwan	11.3	10.8	11.6
	Japan	14.1	14.7	16.7
Rice	Taiwan	22.2	25.1	26.1
	Japan	35.0	36.8	38.6
Sugar cane	Taiwan	684.4	654.4* Four-year average 1933-36.	...
	N. E. I.	1,308.0	1,374* Four-year average 1933-36.	...
	Hawaii	1,349.4	1,515* Four-year average 1933-36.	...

4:Grajdanzev--46-47 S-4 (no date) 1942

Formosans-2

116, 171, 241, 454, 433, 177.24

Japan

636.24

		1928-32 average	1933-37 average	1937
Soya beans	Taiwan	5.6	5.7	6.2
	Japan	10.0	10.0	11.2
Groundnuts	Taiwan	16.2	17.1	18.4
	Kwantung	19.0	20.7	...
Sesamum	Taiwan	3.5	3.9	4.2
	Japan	7.3	7.5	7.5

The yields per hectare of the most important plants in Taiwan's economy are therefore thirty to fifty per cent less than in Japan, or, in the case of sugar, in Hawaii or the Netherlands East Indies, and yet all available sources mention the fertility of the soil in Taiwan, while climatic conditions are at least as good as in Japan or the Netherlands Indies.

The explanation lies in the primitive methods of Taiwan [47] agriculture, including the slight use of fertilizers. Judging by the cultivated area and the number of farmers, the island should have at least 300,000 to 400,000 ploughs, but in 1929 (1) almost all (except

1. The last data available, Nogyo nenkan, p. 642.

18,315 'improved' ploughs for deeper ploughing and 614 of the European type) were of the

4:Grajdanzev--46-47 S-4
116, 171, 241, 454, 433, 177.24
636.24

(no date) 1942

Formosans-3
Japan

primitive Chinese pattern. While in Japan proper an average of ¥170 to ¥180 per hectare is spent each year on commercial and home-prepared fertilizers, in Taiwan less than half that sum is spent for this purpose. These two examples—ploughs and fertilizers—for which quantitative data are available show clearly that Taiwan farming is under-capitalized, especially when we consider that the farmer is obliged to pay ¥2,000 per ko for good land.

This does not of course mean that there is no improvement in the agriculture of Taiwan. The government devotes much effort to increasing the productivity of the farms and the farmers are eager to respond. Yields are now higher than they were twenty years ago, as one may see from the tables given later in this chapter. But progress is slow. It is doubtful whether yields in Japan in 1895—the time of the annexation of the island—were higher than in Taiwan, whereas now they are considerably greater and relatively Taiwan is lagging further and further behind."

"Before we examine the progress that has been made in the production of the most important crops, let us try to evaluate their relative importance in the agriculture of Taiwan. The following table [See following slips, page 49 for table--analyst] gives their gross value for several years (1). It would, of course, be much better to have net

1. Only those products are given, the gross value of which is now over one million yen.

values, i.e. the gross value minus cost of materials, used in production, but these are not available.

This table reveals that Taiwan is an island of two main crops--rice, which accounts for more than half the gross value, and sugar cane."

4:Grajdanzev--48 [2] S-4 (no date) 1942
116, 241, 439, 656, 177.45
636.45

Formosans
Japan

"Rice, as we shall see, is a cash crop; probably not less than two-thirds of the crop finds its way to the market. Sugar cane which constitutes from 12.2 to 19.3 per cent of the total, has special importance because the whole crop is marketed. Sweet potatoes and vegetables are chiefly for home consumption. Next in importance, in the order named, are tea, bananas, groundnuts, pineapples, tobacco, jute, and cassava. This almost complete dependence on rice and sugar cane is the result of government policy, as before 1905 the distribution of cultures was not so specialised. But now Taiwan has become a part of the economy of Japan and its function is to serve that country's needs."

4:Grajdanzev--48 [31 S-4 (no date) 1942

Formosans

116. 241, 311

"Let us now see what part the same crops occupy in the sown area of Taiwan and compare this data with gross value of production. "

4:Grajdanzev--49-51

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(no date) 1942

Formosans-1-5

116, 241, 433

"Gross Value of Agricultural Production in Taiwan
(Million yen)

	1921	1933	1935	1936	1937	1938
Rice	88.7	124.9	197.2	214.0	208.8	237.9
Sugar cane	38.9	29.0	55.2	54.4	64.3	78.2
Sweet potatoes	15.9	20.5	25.4	38.3	27.9	29.5
Bananas	5.9	5.7	6.6	6.8	8.1	10.0
Pineapples	.4	2.0	2.6	3.1	3.1	4.0
Groundnuts	1.9	2.3	3.5	3.9	4.1	3.9
Jute	.5	.8	1.8	1.4	1.5	2.5
Tea	4.0	3.9	6.4	7.4	10.3	9.2
Tobacco	1.0	.9	1.2	1.6	2.1	2.6
Cassava	...	...	...	...	1.4	1.2
Other cereals, beans, vegetables, fruits	12.5	15.7	20.1	11.4	27.2	26.3
Animal products	31.6	32.2	41.0	46.0	49.2	54.9
Total	201.3	237.9	361.0	388.3	413.7	460.2

As percentages of total

Rice	44.1	52.5	54.6	55.1	50.5	51.7
Sugar cane	19.3	12.2	15.3	14.0	15.5	17.0
Sweet potatoes	7.9	8.6	7.0	9.9	6.7	6.4

4:Grajdanzev--49-51

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(no date) 1942

Formosans-2

116, 241, 433

	As percentages of total	1921	1933	1935	1936	1937	1938
Bananas		2.9	2.4	1.8	1.8	2.0	2.2
Pineapples		.2	.8	.7	.8	0.8	0.9
Groundnuts		.9	1.0	1.0	1.0	1.0	0.8
Jute		.3	.3	.5	.3	0.4	0.5
Tea		2.0	1.6	1.8	1.9	2.5	2.0
Tobacco		.5	.4	.3	.4	0.5	0.6
Cassava		...	...	...	...	0.3	0.3
Other cereals, etc.		6.2	6.6	5.6	2.9	7.9	5.7
Animal products		15.7	13.6	11.4	11.9	11.9	11.9
Total		<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>

[50]

Crop Area In Taiwan
(1, 000 ko)

	1921	1933	1935	1936	1937	1938
Rice	510.8	694.4	699.7	702.7	678.1	644.8
Sugar cane	119.9	84.3	121.6	128.3	124.6	134.2
Sweet potatoes	124.5	138.1	142.5	144.5	143.3	138.7
Bananas	6.1	19.2	22.8	24.2	24.1	23.9
Pineapples	1.3	6.6	7.0	8.0	8.9	8.9
Groundnuts	24.4	30.7	31.5	31.7	32.4	32.1

Crop Area In Taiwan [Cont.]
(1,000 ko)

	1921	1933	1935	1936	1937	1938
Jute	2.1	3.0	7.2	5.5	5.2	8.6
Tea	39.1	45.8	42.6	43.0	43.5	43.4
Tobacco	1.4	.8	1.1	1.3	1.5	1.7
All others	190.4	134.1	102.7	109.4	154.2	179.7
Total*	<u>1,020†</u>	<u>1,159†</u>	<u>1,176</u>	<u>1,200</u>	<u>1,216</u>	<u>1,216</u>

* Since the figures of total crop area are not available, the total was calculated in the following way: to the total cultivated area is added the double-crop area of paddy fields for each year. The line 'others' was secured by subtraction from the total.

Source: Nogyo nenkan, 1939-40, pp. 640, 647-652; for 1938, Takumu tokei.

† Approximate figures.

4:Grajdanzev--49-51

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116, 241, 433

As percentages of total

	1921	1933	1935	1936	1937	1938
Rice	50.2	60.0	59.4	58.5	55.8	53.0
Sugar cane	11.7	7.3	10.3	10.7	10.2	11.0
Sweet potatoes	12.2	11.9	12.1	12.0	11.8	11.4
Bananas	.6	1.7	1.9	2.0	2.0	2.0
Pineapples	.1	.6	.6	.7	.7	.7
Groundnuts	2.4	2.6	2.7	2.6	2.7	2.7
Jute	.2	.3	.6	.5	.4	.7
Tea	3.8	4.0	3.6	3.7	3.6	3.6
Tobacco	.1	.1	.1	.1	.1	.1
All others	18.7	11.5	8.7	9.1	12.7	14.8
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>

[51] Rice occupies a predominant position in this table also—from fifty to sixty per cent of the crop area is under rice—but here second place is occupied by sweet potatoes, while sugar cane is third. Then, in order of importance, come tea, groundnuts, bananas, pineapples, jute, and tobacco. It would be a mistake to conclude by comparing percentages of value and of area in the last two tables that rice, for example, is less profitable to cultivate in Taiwan than sugar cane, because in 1937 rice occupied 55.8 per cent of the

area and brought only 51.8 per cent in value, while for sugar cane the corresponding percentages were 10.2 and 16.0. Even if one ignores the cost of labor, one must take into consideration the following circumstances: the growth-cycle of sugar cane is eighteen months in Taiwan, while on more than half the area under rice two crops are taken yearly; sugar cane demands a greater amount of fertilizer, which must be purchased. These considerations suggest that the unwillingness on the part of the farmers to plant more sugar cane for sugar companies is probably due not only to the conservatism of the farmer, but is based on sound judgement. Again, the fact that the area under sweet potatoes is 11.8 per cent while the value is 6.9 per cent cannot be taken as proof that sweet potato culture is less profitable to the farmer than sugar cane. They are now consumed largely on the farm, and if the farmers were to reduce the existing acreage of sweet potatoes, their price would be quite different from what it is now."

4:Grajdanzev--56-57 S-4
116, 241, 439, 441, 655, 177.43
636.43

(no date) 1942

Formosans
Japan

"The price ruling on the Tokyo market is, however, not the price which the farmer in Taiwan receives. Between him and the Tokyo or Osaka market are landlords, usurers, a chain of local dealers in rice, big Japanese importers and exporters, and Japanese shipping companies. Each one of them makes profits, [57]and good profits, so that little remains for the farmer, and especially the tenant-farmer.

However, the advice of Takahashi and others fell on fertile ground and, beginning with November 1, 1939, the export of rice from Taiwan to Japan became a government monopoly. The government-general decides how much rice should be produced, works out a plan of exports for each month, buys rice from the special local organizations, and sells it to a Japanese company, Nippon Beikoku Kabushiki Kaisha (Japan Rice Corporation). The other suggestion of the Japanese economists concerning the lowering of the price of rice in Taiwan may also be attempted, though it will be difficult to realize in a time of war inflation and rice shortage in Japan. "

4:Grajdanzev--61-62 S-4 (no date) 1942

116, 241, 435, 452, 477, 655, 177.47

636.47

Formosans-1-2

Japan

"It is said that there are conflicts between farmers and manufacturers because of the price, and there are also many complaints by the manufacturers that the farmers do not follow their instructions, and yet the manufacturers prefer dealing with thousands of farmers to producing all of the sugar cane themselves. The explanation is simple: it is cheaper to buy from the farmers, not only because the cultivation of [62] sugar cane is a sideline occupation for the small farmer from which he is glad to get even a small reward, but also because of the special regulations imposed on the farmers. No sugar mill can be established without official permission. Simultaneously with licensing, the area from which the new mill may buy sugar cane is allocated. It is not permitted to buy outside this area, and the farmers are obliged to sell their sugar to this mill only. For each mill there are on the average 3,000 farmers and thus there is competition between farmers inside the area, but a monopoly for the buyer. Of course, the farmer is free to sell or not to sell; to plant sugar cane or not. But, as we shall see, he has actually actually little choice in the matter.

The manufacturers have developed and perfected a system of advances to the farmers which deprive them of freedom in such matters. In 1935, for example, about fifteen million yen were paid out in advances. The total value of sugar cane in this year was fifty-five million yen, about one-quarter of which was produced on plantations and about

4:Grajdanzev--61-62 S-4 (no date) 1942

Formosans-2

116, 241, 435, 452, 477, 655, 177.47
636, 47

Japan

forty-one million yen worth on the tiny plots of the farmers. Thus at least thirty-seven per cent of the value of sugar cane was paid in advance. We say 'at least' because fifty-five million yen represents the official value of sugar cane in that year, though the price which the farmer gets may be much smaller than that on which the official estimate is based. It is clear that the farmer gets money in advance only because he is in need of it, and has no money of his own. Since the crop period for sugar cane in Taiwan is eighteen months, the farmer is not free in his economic decisions throughout this period."

4:Grajdanzev--62

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(no date) 1942

Formosans

116, 241, 477, 427

"More than 110,000 ko of land are under control of the companies which for the most part they lease to the tenants. As will be shown later there is strong competition between tenants in Taiwan, and if the company does not supply the tenant with land, he may be ruined. He must therefore get land from the company and raise sugar cane on the conditions dictated by it."

4:Grajdanzev--62-63

S-4

(no date) 1942

Formosans

Japan

116, 241, 312, 471, 177.24

636.24

"By putting irrigation works at the service of the farmers (at a price) the government, the local bodies, and the companies [63] impose a condition that a certain part of the newly-irrigated area should be devoted to sugar cane. This stipulation may be to the advantage of the farmer or to his disadvantage, but it is clear that he is not free to decide."

116, 241, 249, 435

"Although we have no reliable data concerning the profitability of sugar cane in Taiwan as compared with other crops, we can make certain calculations which will help us to see what the farmer gained from its cultivation. The average holdings of farmers did not increase after 1913 and therefore a larger income in these circumstances could be secured in only two ways—through an increase in yield or a rise in the price of sugar cane or both. The improved yields came as a result of the use of better seedlings, earlier ploughing, more careful attention, greater use of fertilizers, better irrigation. Some of these items demand more labor on the part of the farmer; almost all demand a greater expenditure in money. Let us now compare the receipts of the farmer per ko.

Receipts of Sugar Cane Cultivators in Taiwan

	1921	1927	1935	1936	1937
Yield per ko (1, 000 kin)	63.2	89.5	102.8	114.6	112.5
Price per 1, 000 kin (yen)*	9.6	7.6	3.4	4.1	4.5
Value per ko (yen)	696.7	537.0	349.5	469.9	506.3
Value per ko at 1913 prices, yen (approximately)	330.0	310.0	220.0	290.0	270.0

* For 1921-27 for the price 'the cost of raw material for manufacturers of sugar in Taiwan' is taken (Takahashi, op. cit., p. 216); for the later years. the price as it is given in the value of total production of sugar cane in Nogyo nenkan; the actual price is probably smaller.

Great accuracy cannot be claimed for these figures but they may give an idea of the trend. The yield since 1921 was doubled, but the receipts in deflated money do not show any improvement. This may be partially due to the fact that the general index of prices should not be used to deflate values in this case; a special index of prices paid by the farmer might show somewhat better results. But the expenditures which the farmer now incurs in order to secure these increased yields—fertilizers, irrigation, etc.—were not deducted, and if they are taken into consideration, one is forced to the conclusion that some one other than the farmer got the benefits of the better yields."

116, 241, 435, 477, 651, 177.65

Japan

636.65

"Let us now investigate another aspect of sugar cane production. Takahashi, in his book on the economy of Taiwan, (1) points out that as a result of the protective duty on

1. Taiwan Keizairon.

sugar, the Taiwanese farmers receive a subsidy which amounted in 1937 to ¥802.9 per ko. Takahashi arrives at this figure in a simple way: he multiplies the amount of customs duty per kin by the number of kin of sugar contained in the yield of sugar cane from one ko. All this is a fallacy. Let us compare the following figures:

Some Data on the Question of Protection of Sugar-Cane

	Culture in Taiwan	1921	1927	1937
A. Sugar content (%)		9.5	10.3	14
B. Yield of sugar cane per ko (1,000 kin)		63.2	89.5	112.5
C. Sugar content of cane per ko (1,000 kin)		6.00	9.22	15.74
D. Value of cane per ko (yen)		696.7	537.0	506.3
E. What the farmer supposedly gets per kin of sugar content (in sen) (D:C)*		11.6	5.9	3.2
F. Protective duty per kin of sugar, standard No. 22 (in sen)		4.7	5.3	7.2

* As was mentioned above, the price in the text is based on the official estimates of the value of the crop, though the farmer probably gets a considerably lower price.

4:Grajdanzev--64

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(no date) 1942

Formosans-2

Japan

116, 241 435, 477, 651, 177.65
636.65

But here we are interested in the trend of the prices and not in their absolute size.

In 1921 the farmer received 11.6 sen for each kin (0.6 kg.) of sugar content, in 1927 only 5.9 sen and in 1937 3.2 sen, while the protection of sugar in the Japanese empire was increasing (in 1921 it was 4.7 sen per kin, in 1927 5.3 sen, in 1937 7.2 sen). The purpose of the duty, clearly, is not so much to protect the 'poor farmer', as to safeguard the monopoly profits of the sugar companies."

4: Grajdanzev--68 [2] S-4 (no date) 1942
116, 241, 471, 656, 177.65
636.65

Formosans
Japan

"These examples--the cotton plan and horse-breeding plan--are extremely significant. The government officials work out plans which can hardly be called realistic and yet the successes of agriculture in Taiwan are very frequently ascribed to the government's efforts and plans."

4:Grajdanzev--71 S-4
116, 171, 241, 311, 433, 511, 177.24
636.24

(no date) 1942

Formosans
Japan

"It is worth while to observe that in our investigation of agricultural production in Taiwan the figures analyzed were averages, and no question was raised as to whether these averages may be considered representative. The one-sided development of agriculture was emphasized, especially the cultivation of rice and, to a lesser extent, of sugar cane. It is known that one-sided development of agriculture results in soil exhaustion unless sufficient quantities of fertilizers are used, but it was shown that the application of fertilizers is practised on a much smaller scale than in Japan. It was shown also that cultivation is on a low level, yields are low, technique is backward, the draft animal supply is insufficient and per capita consumption of cereals is considerably lower than in Japan.

The expansion of rice production which took place was due chiefly to the increase of the irrigated area and to the increase of acreage from which two crops can be obtained —largely through irrigation and improvement of fields. In the production of sugar cane considerable success has been achieved in increasing the yield and sugar content of the cane. However, in the production of both rice and sugar cane the farmers received a disproportionately small share of the gains."

"The situation in the latter [80] country as regards land distribution is worse now than it was several decades ago and the large holdings are growing.

Distribution of Farmers and Land Tilled and by Size of Farms, 1930

Size of farms cultivated (ko)	Less than 0.5	0.5-0.99	1.0-1.99	2.0-4.99	5 and over	Total
Number of farmers(1,000)	128.0	96.9	100.4	78.9	19.0	423.2*
Per cent	30.3	22.9	23.7	18.6	4.5	100.0
Area of land tilled (1,000ko)	33.7	69.7	143.2	236.1	208.6	601.3
Per cent	4.9	10.1	20.7	34.2	30.1	100.0
Average for groups (ko per farmer)	0.26	0.72	1.43	2.99	11.0	1.63
Average in acres per farmer	0.62	1.71	3.39	7.11	26.15	3.87

*In Nogyo nenkan, 1940, from which we quote, the total is 433,300 but this appears to be a misprint. Even so, it is less than the total should be because, as was shown in the preceding table, there were in the same year 405,181 owners and the number

116, 241, 361, 427

of tenants was not less than 150,000. In other words this investigation evidently covered only a part of the cultivators. This is proved by the figures of the area of land cultivated.

Source: Ibid. "

116, 241, 311, 427, 565

"The figures given above refer to landownership. But the owners of small plots may increase their holdings by renting land. Some economists see the chief advantage of tenancy in the fact that it permits a capable farmer to get as much land as he is able to utilize. We give above the statistics of the size of the farms as actually operated in 1930 [See p. 79, category 116--analyst].

The picture is about the same as that of ownership. More than 30 per cent of the farmers till on the average less than 0.5 ko each (0.62 acres); 53 per cent till on the average less than one ko (less than 1.71 acre) and 77 per cent of the farmers till less than 2 ko (less than 3.39 acres). But 4.5 per cent tilled 30 per cent of the total area, while 579 farmers (or corporations) tilled 66,410 ko. There are therefore a considerable number of very large plantations in Taiwan, chiefly of sugar cane, bananas, pineapples, and tea. These are figures for 1930 and it is quite possible that even then the investigation did not cover all farmers. (1)

1. An indirect proof of this is that a similar investigation made in 1932 covered 340,000 farming families as compared with 405,000 in 1930.

Since 1930 the plantation area has increased sharply, so that the picture should be by now even less favorable. We have no statistics of land ownership by nationalities, but it is well known that all, or almost all, plantations belong to big Japanese companies.

4:Grajdanzev--80

S-4

(no date) 1942

Formosans-2

116, 241, 311, 427, 565

However, it is clear that among Chinese farmers too, there is a sharp division in respect to landownership—there are wealthy Chinese owners, who though few in number, are very important by virtue of the power they wield."

4:Grajdanzev--83 [2]
116, 241, 361, 427

S-4

(no date) 1942

Formosans

"Let us now consider the economy of the tenant. We saw that the tenants and semi-tenants make up about sixty-nine per cent of all the agricultural families. From the table on page 79 it appears that seventy-seven per cent of the farmers (the first three groups) cultivate on the average 0.75 ko each. These two groups should coincide approximately. "

"We have no recent figures of tenancy conditions but, according to an investigation made in 1927, the position of the average farmer-tenant appeared as follows (on land of average quality in paddy with two crops a year):

	yen
Value of crop from 0.75 ko	325
Rent	160
Balance	165

Thus his reward for his and his family's labor for the whole year was ¥165, minus the expenses of production apart from labor. From this sum house taxes, indirect taxes, etc. must be paid. This income of ¥165 may be compared with the income of a landowner who had 15.5 ko (the average for the upper group of landowners) and leased all this land to tenants. His yearly income would be ¥2,480.

These conditions may not exist now, since the above figures refer to 1927. Official sources do not give new figures, but a few calculations show that the situation has not greatly changed. As has been shown, the proportion of tenants to the total number of farmers has increased since that time, so [84] that competition among them must be stiffer, and there is no reason to expect that rents are lower. The value of two crops of rice from 0.75 ko of paddy in 1937 averaged ¥515 but prices general in 1937 were at least thirty per cent higher than in 1927. All this suggests conditions of poverty among the tenants and the position of even the majority of so-called owners may be not much better."

4:Grajdanzev--93

S-4

(no date) 1942

Formosans

116, 241, 255, 257, 433

"Thus the predominant position in Taiwan's industry—from seventy-one to seventy-four per cent of the total—is occupied by the food industry. The latter consists chiefly of the production of sugar from sugar cane, and, to a lesser degree, of the canning of pineapples. In other words, Taiwan industry is closely connected with its agriculture and is largely the transformation of agricultural products into forms suitable for consumption or for storage and transportation. All other industries show little signs of growth. Ceramics and 'other industries' were at the same level in 1937 as they were in 1929, the lumber, textile, metal and machine industries show an increase, but in absolute amounts this increase is small, and only the chemical industry is of any importance, producing about nine per cent of the gross value."

4:Grajdanzev--172-173 S-4 (no date) 1942
116. 452. 241. 476, 563, 177.47
636.47

Formosans
Japan

"Since the start of the present war, however, through increasing supervision and various regulations, the government has turned the coöperatives into a piece of bureaucratic machinery, rather like the paochia. The chief function of the agricultural co-operatives, which form the backbone of the movement, has become the collection of rice and other products and their transfer to the government. According to the declared rations (1), the farmers in Taihoku province, for example, are to have only from two to

1. The ration figures are taken from the Ekonomisuto, Tokyo July 1, 1940.

two and half go of rice per day (0.6-0.75 lb.). But this is considerably below the usual consumption of [173] the farming population, so the farmers will not willingly surrender their 'surplus' and the cooperatives have been turned into organs for the compulsory collection of grain and other agricultural products. The only organization created by the islanders which had some semblance of independent existence is thus becoming a mere cog in the Japanese military machine."

Up to the present only a modest portion of Formosa is cultivated, for the most part this being the coastal regions of the northeast and the western plain; from there only small cultivated strips [32] stretch out towards the east. The chief cereal is rice, which provides two and in some places three harvests a year. The careful cultivation of rice, like the use of the water buffalo, was naturally introduced by the Chinese. The rice fields are laid out on artificial terraces made in the lowest slopes above the valleys, and they are kept under water by means of skillfully constructed canals so that these areas, after the young plants from the seed beds have been laboriously planted, resemble great pools of mud traversed only by narrow paths. But just before the harvest they look like juicy green carpets. The first rice harvest, for which the seedlings are grown in March and transplanted to the fields in April, becomes ripe at the end of June or the beginning of July, the second (on the same fields) at the conclusion of October. The next most important crop in the people's diet is the sweet potato; two harvests are obtained from this also, at about the same time as the rice harvests. Wheat and barley are seldom planted, and always as a winter crop only.

After rice and sweet potatoes, sugar-cane and the tea plant are most frequently planted. The growing of sugar-cane extends over the whole western side of the island; it is found in enormous quantities in the surroundings of Ta-ka⁶ and Tai-nan, but also upstream from Tam-sui, particularly on the flooded ground on either side of the Sintiam River, where the stalks attain the height of two men.

6: Kirchhoff--32 [2]
116, 137, 241

U-4

(no date) 1895

Formosans

As well as indigo, there are grown ginger and plants providing oil, both sesame and peanuts (Arachis hypogaea), and also melons, pineapple, bananas and the South Asiatic tree fruits such as mango and the giant lemons or grapefruit (Citrus decumanus). The Chinese nettle (Su-mo in Chinese) need not be planted any more than the Fatsia papyrifera, since it grows wild in abundance, the latter especially on the mountains round Tam-sui.

"LAND UTILIZATION IN FORMOSA"

* Owing to limitations of space, the text of this article has been considerably condensed from the author's original manuscript, and several tables have been omitted. Also, the difficulties of time and distance have prevented the author from seeing galley proof. --Edit. Note.

Cheng-Siang Chen

Land utilization in Formosa is severely handicapped by the topography. Forest-covered mountains rising to impressive heights form a central range, which extends like a backbone the entire length of the island. Only 36 per cent of the land is utilized, and only 24 per cent of this is cultivated.

According to the comparatively reliable statistics of 1947, the total area of utilized land is 1,290,132 hectares, of which 66 per cent is cultivated (paddy fields, 41 per cent; dry fields, 25 per cent). Considerable changes have occurred during the last 20 years or so Table I (1). The percentage of paddy fields has increased, and that of dry fields

1. All tables are based on data contained in the Taiwan

8: Chen--438
116, 133, 241, 311

N-3

(no date) 1951

Formosans-2

Agricultural Yearbook, Dept. of Agriculture and Forestry,
Taipei.

has decreased, as a result of the development of irrigation and drainage, The progress of economic forestation is reflected in an increase of the forested land; the growing popularity of cremation has reduced the burial ground. Land in railroads and highways has also increased, because of the expansion and development of communications. "

8: Chen--441
116, 162, 241

N-3

(no date) 1951

Formosans

TABLE IV-- FARM FAMILIES AND SIZE OF FARMS
(In cha^a)

DATE	TOTAL	0.5	0.5-1	1-2	2-3	3-5	5-7	7-10	10-20	20+
Oct. 1920	423,278	127,998	96,933	100,403	45,563	33,342	10,362	5,101	2,997	579
"	100	30.23	22.87	23.72	10.76	7.84	2.43	1.24	0.78	0.13
Apr. 1930	436,593	111,805	90,007	113,117	57,521	41,749	13,129	5,938	2,796	531
"	100	25.61	20.62	25.91	13.17	9.56	3.01	1.36	0.64	0.12

^a 1 cha = 0.96992 hectare.

"SIZE OF FARMS

The agricultural population of Formosa is constantly increasing, though the percentage has fallen a little. But the area of cultivated land cannot be extended; consequently, the farms are generally very small, as in the provinces of China proper; moreover, the inheritance system breaks up the farms and further reduces the average size. From 1936 to 1945 the total area of cultivated land in Formosa averaged 846,552 hectares, the number of farm families 448,474; thus each farm family had only 1.89 hectares of cultivated land. Although this seems larger than the average farm on the mainland of China, Formosan farm families average 6.7 persons, as compared with 5.4 persons on the mainland.

In 1939 more than 85 per cent of the farm families had less than the three hectares estimated necessary to maintain a comparatively reasonable standard of living (Table IV); and at present, because of the usurpations and annexations of the landlords, about 46 per cent operate farms of less than one hectare, of which 26 per cent are less than 0.5 hectare. The poverty in rural districts and the hard life of farm families are plain. Those who operate farms of more than 10 hectares are less than 1 per cent of the total number of farm families."

"MULTIPLE CROPPING AND KINDS OF CROPS

The climate of Formosa is warm and hot the year round; rainfall is abundant, the growing season long. Therefore most of the cultivated lands have two harvests a year. In other words, the crop area is much greater than the cultivated area. From 1938 to 1942 the area of cultivated land averaged 858,355 hectares, the crop area 1,364,561 hectares; the multiple-crop index was 159 per cent. Among the hsiens, Taichung has the highest multiple-crop index (176 per cent), Hwalien the lowest (142 per cent).

Of all kinds of cultivated land, the double-cropped paddy fields have the highest multiple-crop index. These fields, which produce at least two harvests a year, occupy about 38 per cent of the total cultivated area. In addition, other crops are planted between the seasons or between the rows of paddy, so that there may be five harvests in two years or three harvests in one year. The multiple-crop index of double-cropped paddy fields approximates the average crop index of the lower Yangtze Valley. In view of the total area of cultivated land, Formosa has the highest multiple-crop index of the provinces of China. It is a compensation for the small size of the farms.

Temperatures permit the growing of many kinds of crops in all seasons, but it is mainly the uneven distribution and amount of the rains that set the agricultural season.

In the southern part of the island rainfall is concentrated in the summer; the winter is extremely dry. In places without irrigation, only one crop of paddy rice can grow, and the time for seeding and planting is fixed. In the northern part, though there is no dry season, the low temperatures and frequent rain in winter are not suitable for paddy rice, and there is a longer time for intermediate crops and fallow. The typhoon season and the length of day are also factors controlling the farming rhythm.

According to the Taiwan Agricultural Yearbook, more than 70 kinds of crops are grown in Formosa. However, three -- paddy rice, sugar cane, and sweet potato-- make up 70 per cent of the total value of agricultural products and occupy 72 per cent of the total crop area (Table V).

The crops may be divided into three kinds: food, cash, and horticultural. Among the food crops, paddy rice is first, sweet potato second. The chief cash crops are sugar cane and tea; tobacco and groundnuts come next. The horticultural crops include fruits and vegetables: banana is the most abundant fruit, with pineapple and citrus fruits next; among the vegetables, radish and mustard leaf are grown the most.

There is no obvious regional distribution of the food crops. For example, the area percentages of rice and sweet potatoes do not vary much among [443] the hsiens. (In Penghu, on account of the frequent gales, rice cannot be grown, and consequently the percentages of sweet potato and groundnuts are unusually high.) The distribution of cash

8: Chen--442-443
116, 241, 311

N-3

(no date) 1951

Formosans-3

and horticultural crops is comparatively centralized. For example, in Taipei and Hsinchu the crop area of tea gardens exceeds 10 per cent of the total crop area of each hsien (average, 1937-1939); in the other hsiens tea gardens are insignificant or lacking. The total crop area of banana plantations in Taichung and Kaohsiung is 85 per cent, and that of pineapple plantations 83 per cent, of the provincial total. The sugar-cane fields of Tainan and Taichung together occupy about 69 per cent of the crop area of sugar cane of the whole province; the citrus orchards of Taipei and Hsinchu occupy 68 per cent of the crop area of orchards of the whole province. As vegetables are mostly consumed locally, their distribution is similar to that of food crops. Largely because of the widespread cultivation of paddy rice, green manure is grown in all the hsiens except Penghu, but in Taipei the interval between the two paddy crops is too short to permit cultivation of green manure, and its crop-area percentage is therefore unusually low."

8: Chen--442-443
116, 241, 311

N-3

(no date) 1951

Formosans -4

TABLE V—VALUE OF AGRICULTURAL PRODUCTS AND AREA OF THE CHIEF CROPS, 1936-1945*

CROP	VALUE (in yen)	% OF TOTAL VALUE	AREA (in hectares)	% OF TOTAL AREA
Paddy rice	272,153,000	47.09	620,560	46.31
Sugar cane	92,704,000	16.05	143,430	12.65
Sweet potato	40,260,000	6.90	142,768	12.59
Banana	12,932,000	2.23	18,003	1.59
Tea	11,581,000	2.00	42,004	3.70
Tobacco	7,082,000	1.22	3,330	0.29
Groundnuts	5,288,000	0.91	25,906	2.28
Pineapple	5,013,000	0.86	8,128	0.72
Radish	4,798,000	0.83	7,709	0.68
Citrus	4,583,000	0.79	4,881	0.43
Jute	2,606,000	0.45	11,167	0.98
Leaf mustard	2,044,000	0.35	3,178	0.28

* The total value of agricultural products includes the value of animal products, and the total crop hectare area includes green manure.

"ROTATION

Formosa enjoys the peculiar advantage of tropical and subtropical agriculture -- year-round rotation. The cycle of rotations for paddy fields ranges from one to four years, but one-year and two-year cycles are comparatively prevalent. The rotation cycle for dry fields is mostly limited to one or two years, except on sugar-cane plantations, where it runs into more than two years. [444]

The popular rotations and their cycles are as follows:

PADDY FIELDS

- a) Paddy rice (Mar., Apr. -July)→Paddy rice (July, Aug. -Nov.)→Green manure (Dec. -Mar.)
- b) Paddy rice (Mar., Apr. -July)→Sweet potatoes (Aug., Sept. -Jan. and Feb.)
- c) Paddy rice (Mar., Apr. -July)→Paddy rice (July, Aug. -Nov.)→Vegetables (Dec. - Jan., Feb.)
- d) Paddy rice (Mar., Apr. -July)→Paddy rice (July, Aug. -Nov.)→Overlapping sugar cane (1) (Oct. -Jan., Feb.)→Green manure (May-Nov.)→Sugar cane (Dec. -

1. 'Overlapping sugar cane' is so called because the young

8: Chen--443-445
116, 241, 311

N-3

(no date) 1951

Formosans-2

sugar cane is planted between rows of the second crop of paddy rice when it is nearly ripe.

Mar., 3rd year)

DRY FIELDS

- a) Groundnuts (May-Sept.) → Sweet potatoes (Oct. -Mar.)
- b) Upland rice (Apr. -Aug.) → Sweet potatoes (Sept. -Mar.)
- c) Green manure (May-Nov.) → Sugar cane (Dec. -Mar., 3rd year)

Paddy rice is generally the first crop. The growing season is usually four months; that for the second paddy crop, about three months and a half. Between the two growing seasons there is a so-called 'summer intermediate crop' season of one to two months; between the second season of one year and the first season of the following year there is a so-called 'winter intermediate crop' season of three to four months. The distribution of these seasons through the year varies according to the region. The first paddy crop is planted and harvested much earlier in the south than in the north. The second paddy crop is also planted and harvested much earlier in the south, but the difference in time is not so great. Thus the summer intermediate crop season begins earlier in the south

and lasts longer, but the winter intermediate crop season, though it begins earlier, does not last as long as in the north, because the following first paddy crop is planted much earlier.

The summer intermediate crop season, because of its short length and overabundant rainfall, is suitable only for green manure and two or three kinds of vegetables. On the other hand, the longer duration and better weather of the winter intermediate crop season make possible the cultivation of many kinds of crops. The duration of the winter intermediate crop season and the intensity of land utilization increase progressively northward; however, north of Hsinchu city the winter intermediate crops are usually delayed by the rainy and chilly weather. As a matter of fact, the middle part of the island, in spite of its rather dry winter, is the best area for winter intermediate crops, because of the development of irrigation; that is why Taichung has the highest multiple-crop index.[445]

Sugar cane is the second crop of Formosa. Since autumn planting became popular, the space left by the young sugar-cane crop has been utilized for sweet potatoes, groundnuts, cotton, wheat, and vegetables. In the paddy fields of the middle part sugar cane and paddy rice are alternately grown. Thus all the cultivated area of the island is utilized to the utmost."

"INTENSITY OF LAND UTILIZATION

If compared with the agriculture of the Philippines and Siam, Formosan agriculture can be called 'intensive'; but in comparison with the agriculture of Japan, it is somewhat extensive. Moreover, rice is the staple crop of Formosa, and its chief production factors are manpower, fertilizer, animal labor, and implements.

To maintain the productivity of the land and increase crop yields, great quantities of fertilizer are needed. After the middle 1920's the use of fertilizer gradually increased—to 133 per cent of the 1924 amount in 1930, to 173 per cent in 1935, to 202 per cent in 1940, and to the peak of 410 per cent in 1943. From 1936 to 1945 the consumption of commercial fertilizer averaged 4,293,000 quintals a year, of which rice and sugar cane consumed the largest amounts (about 50 and 35 per cent respectively). But after the outbreak of the Second World War importation and use of fertilizer decreased, and consequently, fertilizer consumption and crop yield being closely related, the yield of rice and sugar cane also decreased.

Among the rice crops, the Ponlai rice, though its fertilizer and labor needs are greater than those of the native rice, is more commercial, and the method of cultivation is comparatively more progressive. But the intensity of Ponlai-rice cultivation is far

behind that of Japan, and only on the same level with that of Korea. For example, Formosa uses (1935) 34.6 per cent of the amount of natural fertilizer used in Japan, though it uses 119.3 per cent of commercial fertilizer; with respect to the cost per hectare, Formosa spends only 83 per cent as much as Japan. The number of manpower days per hectare is only 49.1 per cent of that in Japan, the amount of wages only 47.4 per cent. The number of animal-labor days per hectare is as much as 97.3 per cent of that in Japan, but the expenses for animal labor are only 57.1 per cent. The expenses for farm implements per hectare are only 28.7 per cent of Japan's. In short, the intensity of land utilization in Formosa is about 57.3 per cent of that in Japan and 95.4 per cent of that in Korea.

From 1931 to 1934 the cost of fertilizer used per hectare in Formosa averaged 51 yen a year; in Japan, 81 yen. However, Formosa's multiple-crop index is about 20 per cent higher than Japan's; consequently, the per [446-453 contain maps] [454] hectare cost of fertilizer must be reduced 20 per cent, to 40 yen—about half the cost in Japan. (Table VI).

The intensity of land utilization of a region is reflected in the unit-area production of the farmland. The intensity of land utilization in Formosa being lower than that in Japan, the average per hectare production of many crops is only 50 per cent of the Japanese production and approximates the average of the provinces of South China (Table VII). "

8: Chen--447[2]
116, 241, 311

N-3

(no date) 1951

Formosans

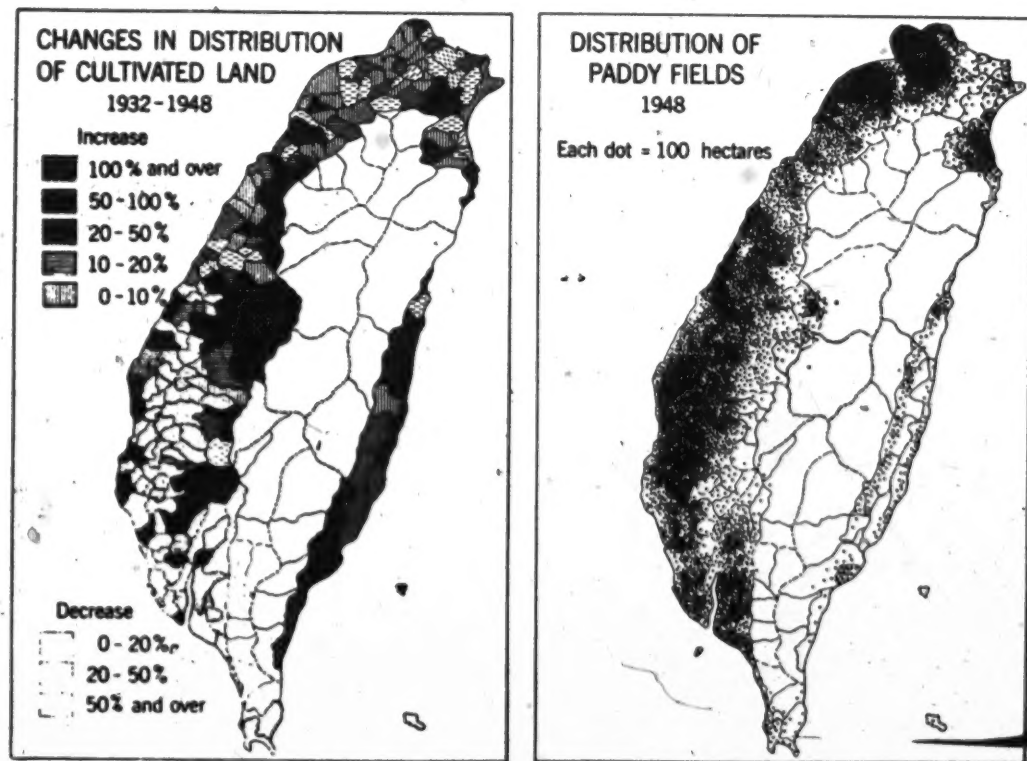


FIG. 8

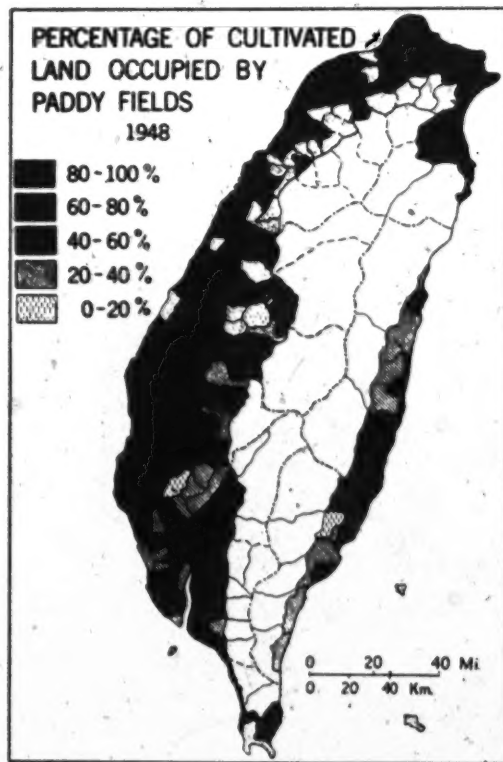


FIG. 10

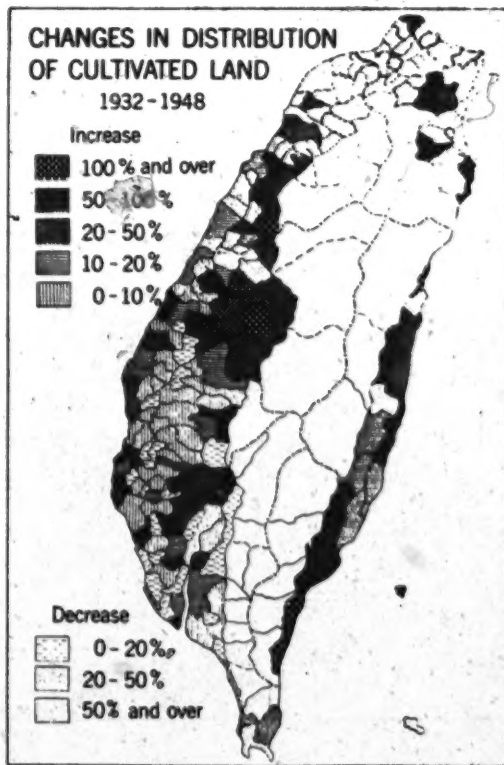


FIG. 11

8: Chen--448 [2]
116, 241, 311

N-3

(no date) 1951

Formosans

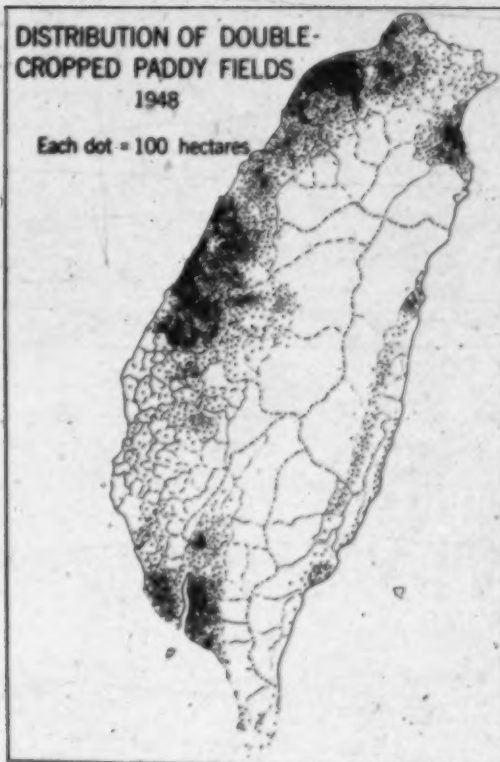


FIG. 12

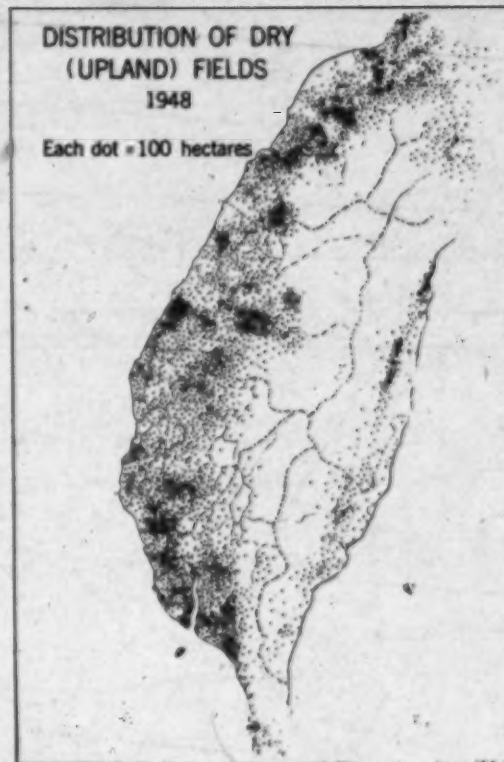


FIG. 11

8: Chen--449
116, 241, 311

N-3

(no date) 1951

Formosans

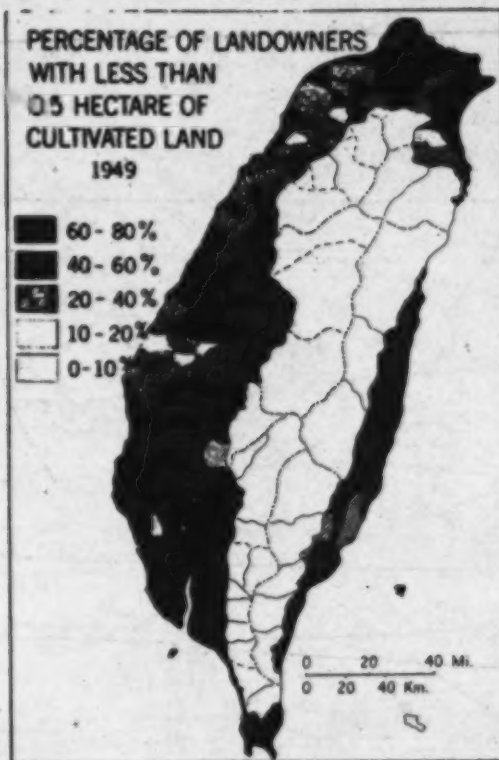


FIG. 14

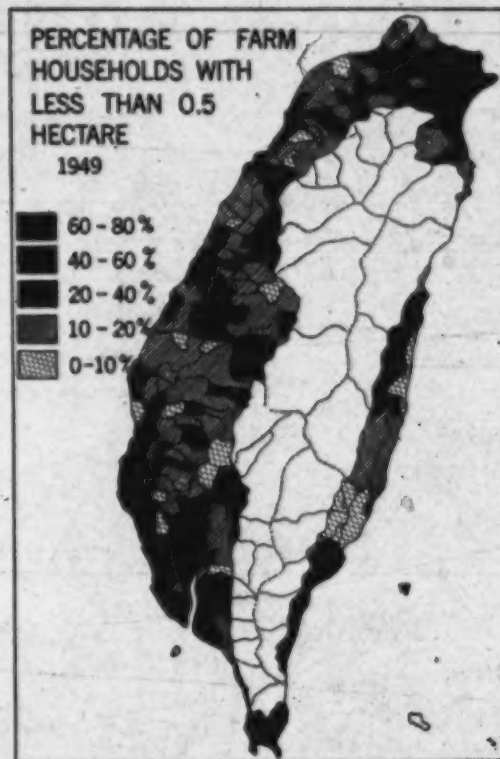


FIG. 15

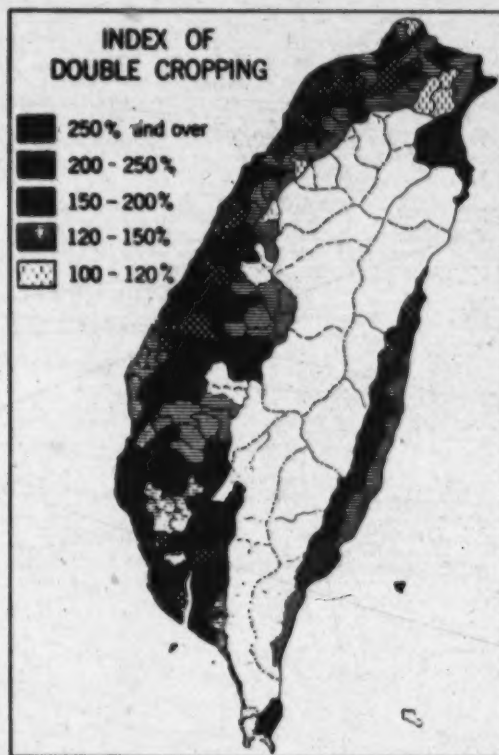


FIG. 32

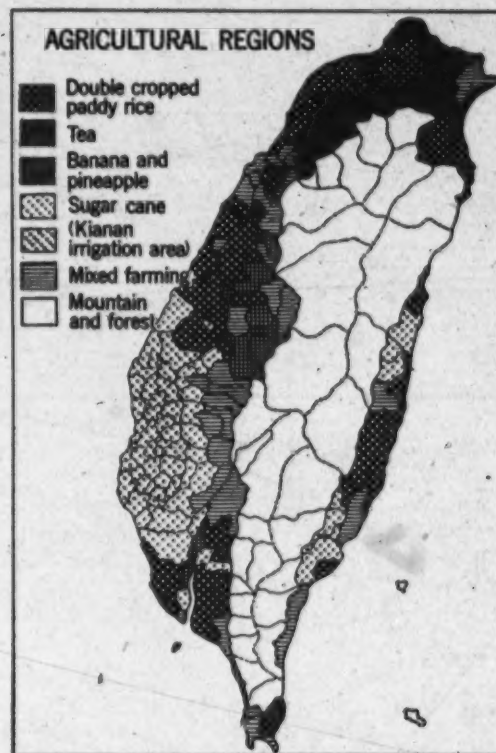


FIG. 33

TABLE VI—PER HECTARE COST OF FERTILIZER IN FORMOSA AND JAPAN
(In yen)

	1931	1932	1933	1934	AVERAGE
<i>Formosa</i>					
Commercial	21	25	33	41	30
Natural	20	21	21	23	21
Total	41	46	54	64	51
<i>Japan</i>					
Commercial	31	33	37	38	35
Natural	42	43	49	50	46
Total	73	76	86	88	81

TABLE VII—YIELD PER HECTARE, FORMOSA AND JAPAN, 1938-1940
(In quintals)

CROP	FORMOSA	JAPAN	FORM./JAP.	CROP	FORMOSA	JAPAN	FORM./JAP.
			%				%
Sugar cane ^a	692.22	558.96	123.84	Wheat	11.04	20.99	52.60
Sweet potato	114.55	129.64	88.36	Radish	95.22	231.00	41.22
Sweet corn	12.94	16.05	80.62	Upland rice	10.45	26.03	40.15
Paddy rice	19.91	29.17	68.26	Jute	12.43	31.44	39.54
Soybean	6.36	10.64	59.77	Barley ^b	5.61	22.64	24.78

^a Because of the incompleteness of the Japanese statistics of 1940, the yield of sugar cane is the average of the three years 1937-1939.

^b In 1939 and 1940 the average per hectare yield of barley in Japan was extremely high, that in Formosa extremely low. From 1936 to 1938 the average yield in Formosa was 7.92 quintals, 37.77 per cent of the Japanese yield of 20.97 quintals.

8: Chen--454[2]
116, 132, 241, 312

N-3

(no date) 1951

Formosans

"IRRIGATION

The general increase in per hectare production in Formosa in recent years is largely due to the progress of irrigation and additional fertilization, as well as to improvement of cultivation and seeding. Because of the great variation in rainfall and the location of the main agricultural region on the western coastal plan, where the winter is extremely dry and the dry season is long, irrigation is necessary. On the other hand, in summer, especially when typhoons pass over the island, the precipitous topography results in floods. The northeast corner, facing the northeast winter monsoon, has plenty of rain the year round; in fact, in many places the winter rainfall is greater than that of summer, and floods are not infrequent. Consequently, drainage and flood control are as important as irrigation. "

TABLE VIII—AREA UNDER IRRIGATION AND DRAINAGE IN FORMOSA
(In hectares)

YEAR	CULTIVATED AREA	IRRIGATION AND DRAINAGE	%
1903	534,157	150,456	28.2
1910	674,100	226,706	33.6
1920	749,419	305,270	40.7
1930	812,116	441,477	54.4
1940	860,439	530,113	61.6
1948	863,156	505,933	58.6

TABLE IX—CULTIVATED LAND UNDER IRRIGATION AND DRAINAGE, BY HSIEN
(In hectares)

HSIEN	1940		1948	
	AREA	%	AREA	%
Taipei	43,801	46.77	47,728	52.80
Hsinchu	89,077	60.02	56,269	37.37
Taichung	120,323	69.93	102,654	58.49
Tainan	178,612	66.70	222,160	85.10
Kaohsiung	77,194	60.62	61,500	46.60
Taitung	7,508	43.21	5,907	28.53
Hualien	13,598	50.73	9,715	37.98

8: Chen--455-456
116, 241, 312, 177. 31
636. 31

N-3 (no date) 1951

Formosans--1-2
Japan

"To a certain extent, irrigation in Formosa was well developed long before the Japanese occupation. As recorded in the twenty-seventh volume of the 'General History of Taiwan' in the later years of the Tsing dynasty, the total number of irrigation reservoirs and ditches was 234. After the occupation the Japanese paid considerable attention to irrigation and drainage. In 1901 'Regulations Governing Public Irrigation Systems' were promulgated, and since then the area under irrigation and drainage has increased annually (Table VIII). In 1903 the total area under irrigation and drainage was 150,456 hectares, 28 per cent of the total cultivated area; in 1942 it had increased to 545,094 hectares, about 64 per cent of the total cultivated area. In area under irrigation and drainage Tainan is first among the hsiens (1948); Taichung comes next; then follow Hsinchu, Kaohsiung, Taipei, Hwalien, and Taitung; Penghu has no irrigation (Table IX). In percentage of cultivated land under irrigation and drainage Tainan is again highest, Taitung lowest.

Among irrigation works in Formosa, the Kianan system, in western Tainan, is the most famous. Construction was begun in 1920 and was finished in 1930, at a total cost of 54,013,000 yen. Today 140,000 hectares of cultivated land are irrigated from the Chenven and Chuhsiu Rivers. Since completion of the Kianan system, land price and land rent within its irrigating area have greatly increased. In 1920 the average land price was

8: Chen--455-456
116, 241, 312, 177. 31
636.31

N-3

(no date) 1951

Formosans-2
Japan

313 yen per hectare, in 1935 it was 1144 yen; land rent rose from an average of [456] 36 yen per hectare to 128 yen; and the value of the yield per hectare increased from an average of 90 yen to 361 yen.

Before the Kianan irrigation system was completed, the average per hectare yield of the rice grown in the western part of Tainan was only 19 quintals. After its completion, because there were still limitations on water supply, paddy rice was grown with sugar cane and sweet potato in a three-year rotation; the yield increased to 27 quintals per hectare. The annual profit on paddy rice, when grown alone, had been 194 yen, totaling 582 yen in three years, but the profit on the rotation was 524 yen for the first year, 272 yen for the second year, and 454 yen for the third, totaling 1250 yen — more than twice the original three years' profit. "

15: U.S. Navy--33 [2]
116, 651, 241, 177.24
636.24

(no date) 1944

Formosans
Japanese

"Compulsory service takes an indirect, though no less effective form in the forced contribution of produce. For instance, a village headman notifies the farmers that their district is expected to provide a certain quota of hay for army horses, which must be forthcoming by a certain date. Castor beans are another example. By requiring this crop (which has no value in the economy of the individual farmer) the production has increased from 126,893 pounds in 1936 to 4,148,364 in 1938, which represents an impressive labor contribution. Through this method a goal of 23,000,000 pounds has been set for 1949. Each year more time and more labor and more space must be given to producing castor oil for the air service. Each household tends a few plants from which the children carry the beans to school for collection. In many instances no compensation is given for the produce, and in the instances where compensation is given, it is wholly inadequate to reimburse the costs of production."

10: Schumacher--222-223
116, 241, 311, 727

T-1

(ca. 1896) 1898

Formosans-1-2

In the north of Formosa are cultivated a variety of products. The region from Kelung to Tamsui is the section that has most definitely been under the influence of Europeans because it is close to the port of Tamsui and the main settlement of the Europeans in Tuatutia. Here in the north all available land is utilized. The industrious people have even turned slopes into productive agricultural land. Yet only rice is cultivated on a large scale although there are indications that at one time in the past other less common products must have been grown. During war time [MC: 1895?] the sugar-cane fields were furrowed and ruined and the tea plantations were neglected. The land as far as Gosche is mainly used for fields of indigo and sweet potatoes; batatas and rice are rare. The region as far as Tschanghua, on the other hand, [223] is claimed almost exclusively by rice culture. It has escaped the destructive instinct of the Japanese because the Japanese troops wear straw sandals on their marches and would have dirtied their feet with mud and walked them sore on the irrigated rice fields; this would have been a definite impediment although it would not actually have been a danger. Economically the most valuable and the most beautiful part of Formosa extends from Tschang-hua to about 20 kilometers beyond Kia-y. The palm groves are rather clear in some sections and here one finds many remnants of protective shelters against the tropical sun where formerly the most precious products were cultivated. Here and there palm groves are lacking. It seems that for the last ten years the Chinese in these districts have confined themselves to a cultivation of rice or sugar-cane, because they required less capital and less

10: Schumacher--222-223

T-1

(ca. 1896) 1898

Formosans-2

116, 241, 311, 727

labor. In view of the political uncertainty and the greed of the mandarins it did not seem advisable to invest large sums for the cultivation of plants of the optimum state.

10: Schumacher--224 T-1
116, 241, 312

(ca. 1896) 1898

Formosans

It has been mentioned that the agricultural population of Formosa is almost exclusively concerned with the cultivation of rice. It is indeed, the extensive cultivation of this product that has changed the character of the climate of Formosa. All the land utilized by rice fields is repeatedly flooded and very ingenious systems have been devised to assure an even distribution of the regularly flowing water of irrigation. The water trickles along in the most intricately arranged channels and often hydraulic engines are used in order to direct the water from one field to another. This continues until the heat of the sun has done away with all of it and the humidity of the air has been increased considerably. The Chinese bring all their manure and refuse to the area surrounding their settlements and therefore the air is most unhealthy and dangerous right there.

15: U.S. Navy--27 [9]
116, 241, 433, 434, 177.43
636.43

(no date) 1944

Formosans
Japanese

"Food is plentiful, but is subject to requisition by the Army. The farming population is able to raise a substantial amount of the food it consumes, but the Japanese frequently order the restriction of plots planted to these crops in order that more space may be devoted to a crop (castor oil beans for instance) required by the military. In 1940 the official daily ration of rice permitted to farmers in Taihoku Province was only 0.60-0.75 pounds, or 2-21/2 go per person. This is well below the usual consumption and has been the cause of bitter discontent and resistance."

15: U.S. Navy--30 [8]
116, 241, 516

(no date) 1944

Formosans

"There are many folkways and habits among the Formosan-Chinese which are of no importance administratively but which attract the attention of strangers on the island. These include the practice which farmers have of kneeling in the muck of the paddy fields and advancing through the rice rows on their knees, planting or weeding, instead of standing and bending or stooping to plant."

15: U.S. Navy--31 [7]
116, 162, 241, 177

(no date) 1944

Formosans

"Approximately 53 percent (2,880,410) of the population of Taiwan was engaged in agriculture at the end of 1937. The remaining 47 percent was engaged chiefly in trade and commerce.

In 1937 the number of persons employed in industry had grown to 87,244, an increase which reflects the rapid expansion of industrial enterprise. The distribution of labor was then as follows:

Table 24: Distribution of Labor in Industry

Industry	No. of Persons Employed	Percentage
Food (including sugar and pineapple processing workers)	48,615	55.6
Chemicals	4,988	5.7
Textiles (including hemp processing)	4,000	4.5
Mining	4,214	4.7
'Others'	25,427	29.5
	87,244	100.0"

22: Wiedfeldt--17 [4]
116, 423, 311, 241

F-5

(1913) 1914

Formosan Aborigines
Atayal

As long as the family is making use of its plot of ground, their possession of it is protected. As soon as they leave it, which happens after two, or sometimes three crops, because the soil will not produce anything any more, any other family of the clan can take possession of it. This does not generally happen, however, before seven years have passed, and the field has become covered with a luxuriant growth of bushes and trees.

We travelled from Taihoku by train for 1 1/2 hours until we came to the small village of Toyen. Here the land is almost level and has been utilized to the fullest extent. The extensive rice plantations were green and threw into relief the picturesque houses of the Chinese; these are solid brick houses with a curved roof reminiscent of Buddhist temples. In the canals, for which the tributaries of the Tamsui are utilized, there are numerous tame ducks. In the small ponds one may see grey water buffalo, a domestic animal which occurs in large numbers of Formosa. It cannot be compared to European cattle as regards its usefulness in agriculture, and so far attempts to domesticate it have not been successful. Many times I saw the patient Chinese peasants threatened by the buffalo or saw that the animal had broken loose. Next to the rice fields there are extensive tea plantations. This is the region where the famous Oolong tea is produced. There are also banana and pineapple plantations on a smaller scale. The houses are surrounded by slender bamboo trees, and everywhere one may see betel palms, a tree which grows everywhere on Formosa.

The agricultural population [606] contrasts favorably with the migrant workers in the cities. Their agricultural methods are well organized, although it is true that they are based on experience rather than theory. A further testimony to the industry and diligence of the Chinese is the fact that in this field the Japanese cannot compete with them.... There are no Japanese farms on Formosa, although there is still enough land for this purpose. The island is thickly populated; there is an average of 86 inhabitants per square kilometer.

37: Steere--316 [2]

S-3

(1873-74?) 1875

Formosans

116, 132, 311, 241

"The southern part of the island is in the tropics. There is much rain in the north part of the island, especially at Kelung. At Takao and Taiwanfu, it is dry from October to April, but it rains much sooner in the mountains to the east, the rains already beginning there in February." Rice is the principal crop cultivated upon the low level lands to the west, and there is much exported to China. The best lands produce three crops annually. Lands that are harder to irrigate are planted to sugar cane, and large quantities of sugar are exported in foreign vessels to Japan and Australia. Upon the first of March ten or twelve vessels were lying at the ports of Takao and Taiwanfu, all loading with sugar."

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tenants there has been a rent reform program, which went into effect in 1949 and set a maximum rental ceiling of 37.5 percent of the total yield (average rental had theretofore ranged from 46 to 62.5 percent of the total yield). The income of tenant farmers has, in consequence of the program, risen by an average of 30 percent. The reform legislation provides that where the main crop yields are less than 20 percent of normal the tenant shall not be required to pay any rent at all. It also gives the farmer security of tenure (landlords may no longer refuse to renew contracts in order to re-rent on more favorable terms), and it restricts landlords' right to dispossess tenants. By 1951, 97.54 percent of the tenant farmers had completed new contracts under the new law, and the landlord problem had been brought, for the most part, under control. The price of land has steadily declined, which, of course, enables more and more tenant farmers to buy land to own. The rent reduction program has been carried out in cooperation with a Chinese-American organization, the Joint Commission on Rural Reconstruction, which is responsible for a program of general agricultural improvement: the construction of irrigation dams and canals, reclamation projects, the making available of better seeds and fertilizers, animal disease control, the organization of farmer associations and rural cooperatives, and rural health measures.

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By the end of the period 1950-1951, the use of US-financed fertilizer had brought rice production to the highest peak in the history of Taiwan. In exchange for much-needed foreign currency, twenty-two thousand, five hundred eighty-seven metric tons of Taiwan's surplus were exported to Japan and South Korea. Other foods basic to local consumption were also above peak prewar production levels. Sweet potatoes were up 20 percent, wheat 165 percent, and peanuts 89 percent. Considering the handicaps under which the government started, the economy of Taiwan is now surprisingly stable, largely because of the increased agricultural productivity reflected in the foregoing statistics.

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Economic Reform

In 1949, to meet the economic crisis precipitated by the soaring inflation of the Chinese National currency, to which the Taiwan dollar was then linked, a fresh start was made by introducing a new currency, linked to the US dollar and backed by gold bullion brought over from the mainland. At the same time, a series of deflationary measures were enlisted. The government's expenditures, for example, were curtailed by reducing its personnel and cutting back certain of its activities; at the same time, its resources were increased by means of a new luxury tax (based upon ownership of property, including cars and refrigerators), a defense tax, the floating of bonds, and the sale of government assets. The program, as a whole, had the effect of encouraging private enterprise, so that the usual sources of revenue (customs receipts, returns from the salt monopoly, the postal services, and assorted government enterprises in fields like telecommunication, air transport, navigation, petroleum, aluminum, gold, coal, copper, and steel) became more productive.

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Industrial Recovery

In industry, Taiwan's return to prosperity has been extremely rapid. At the time of Japan's surrender, the annual coal production had dropped to 776,000 metric tons (as compared to peak production of 1,182,635 in 1941); electric power had fallen off to 52,646 KW (as compared to the peak load of 152,355 KW in 1943); the production of sugar (the chief product for export) had declined to 86,073 metric tons (as compared to 1,418,000 metric tons before WW II), that of cement to 78,000 metric tons (as compared to peak production

C. General Characteristics

181 Formosans are considered to be industrious and resourceful. Perseverance, tenacity, and endurance are characteristics of the majority. The rural people show a strong feeling of solidarity and affection to members of their community and have a strong attachment to the soil as representative of their homeland and their way of life. Family loyalty and filial love are considered the greatest of virtues. Deep love for the family circle is further accentuated by the frontier environment of Formosa. In the cities, people tend to become more independent and self-reliant. Because it is not the custom to pool resources for joint enterprises outside the immediate family, only small businesses can be established. If the head of a small urban household suffers a long illness or extended unemployment, the family falls into dire need. Most families so afflicted must return to rural areas and live with kinsmen until they have acquired enough capital to go back to the city and try again.

D. Recreations and Sports

- 241 Formosa's subtropical climate makes
461 farming possible in all seasons; most farmers

241 on the island work every day of the year. The
461 growing industrial society, however, allows
one day of rest each week, and office workers
and shopkeepers are accustomed to a long
lunch recess in the European fashion.

177 A majority of city dwellers have running
water and electric lights. Most families in
the cities own sewing machines and bicycles.
As the islanders acquire Western conveniences
and possessions, their patterns of living take
on the configurations common to the occidental
world.

526 Sports -- soccer, basketball, and
baseball -- are popular among the younger
generation. A Formosan basketball team
toured the United States and countries in
Southeast Asia in 1955. A soccer team from
Formosa is to participate in the Olympics
in Australia.

524 Mah-jongg and chess, traditional games
517 of the leisured class, have retained their
popularity among the older generation. The
517 young favor motion pictures and dancing.
529 Government officials and wealthy persons of
other classes take their families to one of the
numerous scenic resorts or hot springs in

464 natural rate of increase and emigration remain the same.⁷ Since agricultural employment, which was about 1.2 million in 1950, is assumed to remain constant because of limited arable land, the number of jobs for male non-agricultural workers will have to be tripled by 1980, just to provide enough employment, to say nothing of an improved standard of living.⁸

II. FARM LABOR

• 241 Size of Farm Households and Labor Force.

In 1952, the total rural population of Formosa amounted to 4.3 million, or about 680,000 farm households. The average size of a farm household at that time was 6.3 persons.⁹ An accurate estimate of the size of farm labor is extremely difficult because women as well as children also take part in farming. Women also work in the field and dry harvested rice. Children may deliver food to the field where adult family members work. Farming in Formosa is a household responsibility, and a clear-cut

7. A Report on Taiwan's Population, Princeton, Princeton University Press, 1954, pp. 53-55.

8. The constant number of farmers at 1.2 million for the period 1950-80 is only an assumption. In 1954, the total number of farmers was reported to be 1.8 million.

9. Taiwan Provincial Government, Taiwan Agricultural Yearbook, 1953, Taipei, 1953, pp. 36-37.

- 241 demarcation of duties or types of work is rather difficult. According to a survey made by the Joint Commission on Rural Reconstruction (JCRR), on the basis of 4,000 sample families, in 1952 there were 8.14 persons to each farm household, and the actual working force of each household was 3.21 man-equivalents.¹⁰ If this relation was applied to the whole farm population pro rata,¹¹ the actual working force on

10. Y.C. Tsui and S. C. Hsieh, Economic Digest Series No. 4: Farm Income of Taiwan in 1952, Taipei, JCRR, 1954, pp. 12-13. One man-equivalent equals a full-time farm laborer between the ages of 16 and 60.

11. Rigid application of this ratio to the total farm population may be open to criticism in regard to the age composition of all farmers and their families and their sex distribution. Moreover, the survey represents only one year (1952) and certainly cannot be interpreted as representing the general trends. However, in the absence of a complete survey or more satisfactory sampling, the rough approximation obtained by the following means would work for our purpose here:

Average man-equivalent per family (3.21):
 Average persons per family (8.14) $\div$ $\bar{X}$ (Total man-equivalent): Average number of persons per family for the whole island, and $\bar{X}$ multiplied by total number of all farm families.

- 241 Formosan farms in 1952 would reach 1.7 million man-equivalents.¹²

241 Size and Mobility of Surplus Farm Labor.

464 In Formosa there are two, three, and, in some cases, as many as four harvests per year. Therefore the frequency of planting and harvesting is high. The supply of family labor is usually constant. It is true that where there are extra young workers in the family, they often are attracted to the cities in quest of employment or to road construction, water conservation work, etc.; however, strong family ties usually cause them to return if city employment fails to materialize or when temporary construction jobs terminate. The high frequency of planting and harvesting accounts for the absence of prolonged periods of seasonal slack in farm work in spite of the constant supply of family labor.

Formosan farm labor in general is not mobile. Under the current laws regulating the lease of farms, the tenants, by virtue of their contracts with the land owners, have

12. This figure comes close to the total agricultural workers of 1.8 million in September 1954 as reported in Taiwan: Land of Opportunity, Economic Stabilization Board, Republic of China. However, the latter estimate did not disclose how the figure was reached.

- 241 the right to cultivate the land for six years.¹³
464 This arrangement gives the farmers a feeling of security and tends naturally to tie them down to the land. As a result of the land reform, 76 per cent of the farmers are now owner-cultivators.¹⁴ whose land ownership results in low mobility. However, it should be noted that all surplus farm labor can be made available for other employment, permanent or temporary.

As seen in the following table, the per chia farm population increased from 3.0 persons in 1929, to 4.3 persons in 1949, and 4.7 persons in 1952.¹⁵ As of 1952, the size of surplus labor on the farms may be estimated at 68,000 man-equivalents.¹⁶ This labor force is a surplus in the sense that the available manpower exceeds the actual need.

13. Article V, Regulations Governing the 37.5 per cent Land Rental, promulgated on June 7, 1951.

14. United Nations, Department of Economic and Social Affairs, Economic Survey of Asia and the Far East 1954, Bangkok, 1955, p. 88.

15. The increase is principally through natural increase of the farm population.

16. The estimate is based on the JCRR survey Farm Income of Taiwan in 1952. The provincial average of 270 days requiring 3.21 man-equivalents applies to the production of all crops. Supposing that each farmer can work (continued next page)

• 241

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16. (continued) 310 days per year (less Sundays and holidays), each 3.21 man-equivalents will have done 40 days of work in addition to the 270 days required for farming. When this extra working manpower is multiplied by the existing farm labor force -- 1.7 million -- it will result in a farm surplus labor force of 68,000 man-equivalents. This is a conservative estimate because some farm families put in more than 400 working days a year in several regions and because farmers seldom take holidays other than national ones.

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311

AREA OF CULTIVATED LAND AND FARM POPULATION*

Year	Farm Population (Thousands)	Cultivated Area (chia)	Population (per chia)
1929	2,489	830,010	3.0
1939	2,925	886,225	3.3
1949	3,880	891,675	4.3
1950	3,998	897,522	4.3
1951	4,161	900,961	4.6
1952	4,257	903,369	4.7

* Figures for 1929 and 1939 from Taiwan keizai nenpo 1941 [Taiwan Economic Annual], Kokusai nippon kyokai [International Association of Japan], The rest from Taiwan Agricultural Yearbook, 1953. Persons per chia calculated.

- 241 The Farmers' Outlook. Since the Restoration, the land reform program has been carried out and farmers are enjoying a greater sense of freedom and individual initiative. However, the farmers are inclined to compare the current situation with conditions under the Japanese with regard to farm receipts, living conditions, political freedom, etc. In the eyes of the farmers, the Nationalist Government's success in its administration of Formosa has depended upon and will continue to depend upon how favorably its accomplishments will compare with those of the Japanese.

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435 It is reported that a large disparity exists between the prices received for farm products and the prices paid for supplies used on the farm. To illustrate this point, the per chia farm receipts from all sources amounted to NT \$9,700 in 1952,¹⁷ while the per chia expenditures (for production purposes) were NT \$5,400. Thus, the net earnings amount to NT \$4,300 per chia, which constituted the support of 4.7 persons, the latter being the average farm population per cultivated chia.

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208 When asked in a JCRR survey in 1952

17. New Taiwan Dollars. The prevailing rate of exchange during the year was NT \$15.65 to US \$1.

- 241/208 whether current conditions were better than those in 1937, 35 per cent of the 1,176 farmers answered in the affirmative, while 43 per cent answered in the negative, with 16 per cent indicating that conditions were about the same.¹⁸ Among the main reasons given for the affirmative answers were land reform, more political freedom, and larger supply of household goods. Negative answers were attributed to an increase in farm population and high prices in general in comparison with the prices of farm products. However, the general outlook was hopeful among the farmers surveyed. Many of them expected to own their houses and land. Nearly 50 per cent of the heads of households stated that conditions would probably be better during the next ten years. This optimistic conviction was apparently based on the assumption that the land reform program would be carried out as planned, that peace would prevail, that prices would become lower, that more factories would be established, and that the surplus population could go back to the Mainland after the latter's liberation from communism.

18. A. F. Raper, Rural Taiwan -- Problems and Promise, Taipei, JCRR, 1953, p. 282.
The remaining 6 per cent made no answer.

Annex "A," Subparagraph 3a',
Economic Background

GENERAL STRUCTURE OF ECONOMY

241
134 Two-thirds of Formosa is mountainous and one-third is lowland. The mountains are rugged and covered with dense forests, but most of the lowland is well suited to the production of commercial crops. Though the Tropic of Cancer passes through the island, its climate is mild, with moderate temperatures and abundant rainfall. Two major crops a year are usual and a third crop of vegetables often increases the total yield. The soils are generally fertile, but frequent inundation and heavy year-round cropping cause excessive leaching. To maintain fertility, large quantities of fertilizer become a necessity.¹

135 Mineral resources do not appear to be abundant. However, since much of the mountainous regions has not been thoroughly

1. The application of fertilizer to riceland in Formosa averages 50 pounds per acre per crop. Chiao-min Hsieh and Alice Taylor, "Formosa" Focus, N. Y., April 1955, p. 5.

135 explored geologically, the situation with respect to mineral resources could be changed considerably in the future. Bitumous coal is abundant in the northern part of the island, and some high-grade coking coal has been recently discovered at Nanchuang near Miaoli. Large reserves of copper and sulphur and some gold veins are located in the northeast part of the Taipei area. Pyrites in limited quantities are mined in the north, primarily for use in the fertilizer industry. Limestone and glass sand are also available for building purposes. But such ores indispensable to industrial development as iron, bauxite, lead, zinc, tin, and magnesite² are scarce or non-existent on the island and must be imported. As much of the rock formation on the island is petroliferous, large oil and natural gas fields may be discovered in the future, but as yet petroleum finds and development have been insufficient to offset reliance on foreign sources of supply.

- 241 The economy of Formosa is essentially agrarian; although only one-fourth of the total land area is arable, most of the population is engaged in farming. Ever since the Dutch

2. Mercury and manganese ores are found in the mountains near Yilan.

- 244 occupation in the first half of the seventeenth century, rice and sugar have been the staple products of the island.

241
245 Under Chinese rule in the eighteenth and nineteenth centuries, a constant influx of immigrants from the mainland reclaimed the extensive western plains of Formosa for the cultivation of rice and sugar. The foothills surrounding the plains were terraced for the growing of tea. Further in the mountains, 208 camphor was gathered from the dense forests. In the more isolated mountain region, aboriginal tribes practiced hunting and slash-and-burn agriculture. Coal mines were operated for a time by the government but were later abandoned.

489 Except for a 60-mile stretch of railway between Keelung and Hsinchu, communications was primitive until the present century. Rafts, boats, and junks were used along the coast and on lakes and rivers. Overland, the inhabitants were obliged to travel either in man-borne palanquins³ or ox-drawn carts. 431 Western merchants handled a small international trade, consisting of tea, camphor, and sugar.

3. A closed litter commonly used as a conveyance in China.

423 was entirely wiped out by subsequent devaluation
427 of the currency. The Formosan landlord
should be especially contented, when he ponders
the lot of his brothers on the Mainland. In
sharp contrast with the moderate measures in
Formosa, the Communists liquidate the landlords,
confiscate their land, and make collective
serfs of the peasants. The effect of the land
reform in Formosa is expected to be more far-
reaching than the economic betterment of the
peasant class; it is an important asset of the
Nationalist Government in anticipation of the
liberation of the China Mainland.

423 In connection with the successful
• 421 redistribution of land in Formosa, it should be
added, however, that we must not assume the
economic problems of the Formosan farmers
who comprise 52 per cent of the total
population have been completely solved. First
of all, the average size of the farm is too
small for economic sufficiency, for 47 per
cent of farmer families own less than 0.5
chia (1.2 acres) of farm land, 70 per cent own
less than one chia (2.4 acres) and 93 per cent
less than three chia (7.2 acres).²⁶ The average

26. From Statistics on Landownership
Classification in Taiwan China, 1952, compiled
by Provincial Land Bureau, Taipei, June 1952.

423 land owned by each farming family in Formosa
241 is 1.28 chia or 2.8 acres as compared with
215.3 acres owned by each farming family
in the United States.²⁷ The small size of the
farms limits the living standard and the
purchasing power of Formosan farmers. Even
the small parcel of land owned by the average
farmer is threatened with further partition on
account of the enormous rate of natural
increase in population. The average size of
farms on Formosa has decreased from nearly
2 chia (.5 acres) in 1937 to the present 1.3 chia.
Unless industrialization of the island can
divert members of the growing farming families
to industrial enterprises, the size of farmland
per family will be further reduced through
inheritance and will become too small to main-
tain even a marginal subsistence. It will be
indeed a serious situation. Furthermore, for
lack of capital, and relying principally on
human labor, the efficiency of Formosan
farming is low, and the cost of production is
387 high. The soil of the western coastal plain is
241 alluvial, lacking sufficient humus to be fertile.
Fertilizer is needed to increase its productivity.

27. Report of United States Bureau of the
Census for 1950.

28. The application of fertilizer to riceland
in Formosa averages 50 pounds per acre per
crop, whereas in Japan, the figure is 66 to
98 pounds.

387 The Chinese Nationalist Government with

241 American aid has made special effort to

- expand the production of fertilizer in the past five years²⁹ and make it available to the farmer through the Land Bank of Taiwan and the farmers' associations. The Kaohsiung Ammonium Sulfate Corporation reduced the selling price of fertilizer, from NT\$3,100 to NT\$2,800 per metric ton in June 1954 and then to NT\$2,200 in August 1954. But the present production still falls short of the estimated annual requirement of 740,000 metric tons.³⁰

241 At present, farm mechanization is in
407 its infancy. Little power is employed in agricultural production. Farm implements are crude and clumsy; they do not plow deeply and evenly, and so the distribution and the depth of the seeds sown are not uniform. The Sino-American Joint Commission on Rural Reconstruction is sponsoring many projects to

29. Production was increased from 45,840 metric tons in 1949 to 168,491 metric tons in 1954.

30. The amount of fertilizer actually used in 1952 was 535,801 metric tons-- (732,600 short tons), JCRR General Report IV, Taipei, 1953, p. 55.

- 24) improve the designs of local farm implements --
407 the plow, the hoe, the sickle and the rice
thresher; it is also introducing the use of hand-
operated semi-automatic sprayers and rotary
dusters. A demonstration of mechanized
farming was made on an abandoned pineapple
farm in Laopei. It was found that, with deep
sub-soiling and deep plowing by a tractor,
the cost of production can be reduced from 35
to 40 per cent. This clearly proves that land
reform is but one step toward the amelioration
of the economy of the farming population in
Formosa. In order to raise the standard of
living of the farmer, when the arable area is
limited and the average holding is small, the
per unit and per capita yield must be increased.
To enhance a program of productive efficiency,
which would include the application of greater
amounts of fertilizer, the mechanization of
the farms, and other improvements of
agricultural techniques, the farmer himself must
learn these modern methods in order to increase
the value of the land he holds.

Annex "A," Subparagraph 3a,
Economic Background

AGRICULTURE

I. INTRODUCTION

241
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431 Formosa's economy is predominantly
agricultural. Household registration in 1950
indicates that a gainfully employed male
population of 2.1 million, roughly 57 per cent
were farmers.¹ The Taiwan Agricultural
Yearbook reports that about 52 per cent of
the total population in 1953 were directly
dependent on agriculture for a living.²
Approximately 49 per cent of the total national
income in 1951 was derived from agriculture.³

1. George W. Barclay, A Report on
Taiwan's Population, Princeton, Princeton
University Press, 1954, p. 59.

2. Provincial Government of Taiwan,
Taiwan Agricultural Yearbook, 1954, Taipei,
1954, p. 1.

3. Industrial Development Commission,
Economic Stabilization Board, Industry of
Free China, November 1954, Vol. 2, No. 5,
Taipei, p. 7. Agriculture is defined to mean
all productive activities involved in farming,
livestock-raising, forestry, and fisheries.

[162]

- 241 The importance of agriculture to the national
434 economy is made more obvious by the fact
that a large percentage of Formosan industries
involve the processing and transporting of
agricultural commodities. Agriculture products
also provide an important source of foreign
exchange for the island. In 1953, total
[139] exports amounted to approximately
US\$130,000,000, of which over 90 per cent was
derived from the export of agricultural
products.

- 241 The climate in Formosa is eminently
suitable for agricultural production. The
tropical and sub-tropical atmosphere and
abundant rainfall in most parts of the island
encourage the cultivation of rice, sweet
potatoes, sugar cane, tea, bananas, and
vegetables. Rice cultivation is carried on in
all parts of the island; sugar cane, sweet po-
tatoes, and peanut are grown in the central
and southern sections; tea is cultivated in the
northern districts.

- 648 During the Japanese occupation of
241 Formosa, the policy of economic development
was geared to the economic needs of the
Japanese Empire. When a shortage of rice
was felt in Japan, rice was produced in

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greater abundance in Formosa. Japan's inability to purchase sugar in the international market was balanced by the great quantity of sugar produced in Formosa. Japan's greatest economic efforts on the island were concentrated upon agricultural production in order to exploit to the full Formosa's agricultural potential.

31/ total arable land has remained more or less constant, in spite of the fact that some land along the eastern coast of the island as well as some 300,000 hectares of grass land in the mountains might be developed either for crops or as grazing land if the expense of such projects did not seem to indicate that the cost would be prohibitive.⁴ When the [53] Shihmen dam and reservoir project is completed, waste land on the banks of Tanshui River can be converted into paddy fields. It is believed that the completion of the dam will make possible the reclamation of at least 54,000 hectares.⁵

- 24/ Paddy fields constitute about 60 per cent of the total cultivated land in Formosa. They are classified in two categories -- double-cropping fields and single-cropping fields. The former yields two crops of rice each year. Between rice crops, one crop of vegetables is planted and harvested. In single-cropping fields, besides one crop of

4. Table 196, "Summary of Statistics of Taiwan for the Past Fifty-one Years," Taiwan Agricultural Yearbook, 1954, p. 20.

5. Chung-yang Jih-pao [The Central Daily News], Taipei, July 1, 1955.

- 24/ rice, one or two crops of sweet potatoes, peanuts, wheat, or flax are planted, the number depending upon the time necessary for the harvest. The fertility of the soil is heavily taxed by the practice of multiple-cropping, and the intensive use of fertilizer is necessary. Ch'en Cheng-hsiang places the index of multiple-cropping at about 160 per cent -- the ratio of crop area to cultivated area.⁶

III. FARM PRODUCTIVITY

24/ 43/ The productivity of Formosan farmland seems to depend upon the intensity of cultivation. It has been reported that the average yield per chia of both first and second

6. Ch'en Cheng-hsiang, T'ai-wan T'u-ti Li-yung [Land Utilization in Taiwan], Taipei, National Taiwan University and Joint Commission on Rural Reconstruction, 1950, pp. 95-96. The per cent quoted is an average for the period 1938-42. The index may be slightly higher in recent years as the land is utilized to greater advantage and the practice of multiple-cropping is used to increase production.

(Table 3 faces p. 536.)

Table 3. Selected Crops - Yield Per Hectare*
(in kilograms)

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	Prewar Peak Year	1945	1949	1950	1951	1952	1953	1954
Rice	2,242 (1938)	1,273	1,624	1,845	1,882	1,998	2,109	2,183
Sweet Potatoes	12,734 (1937)	8,650	9,172	9,443	8,737	8,953	9,576	10,459
Sugar Cane	78,860 (1939)	38,628	50,604	48,064	45,237	49,003	74,136	
Wheat	628 (1941)	296	720	1,042	1,058	1,139	1,058	1,403
Crude Tea	375 (1917)	61	283	279	294	305	305	291
Soybean	520 (1922)	264	594	618	577	602	617	683
Jute	667 (1939)	326	797	766	894	1,242	787	

* Taiwan Agricultural Yearbook 1954, Taipei, 1954, pp. 1-81. Yields for the prewar peak years are calculated by the author from the same source. The 1954 figure are from China News Press, China Annual 1954, Taipei, 1954, Vol. 3, pp. 6-7.

(facing p. 536)

24/ rice crops tends to decrease as the size of
433 the farm increases.⁷ The smaller the farm,
the more intensive the cultivation, the higher
the yield. Productivity also varies according
to the fertility of the land and the efficiency
of the cultivation.

24/ As a rule, farmers on the island do not
regard farming as a source of profit but
as a means of insuring the subsistence of their
families.⁸ Those who make their livelihood
by growing rice will continue to grow rice
even when other crops seem to offer a
greater margin of profit. To them, rice is
their sole security, and they use rice to pay
their taxes, to barter for other commodities,
and to feed their families. Rice becomes
"money in the bank."

7. The chia is a local measure of land
area = 2.4 acres.

8. Bank of Taiwan, Economic Research
Department, T'ai-wan Yin-hang Chi-k'an
[Bank of Taiwan Quarterly], Vol. 5, No. 4,
March 1953, Taipei, pp. 1-27.

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The yield per unit area of various crops has been increasing steadily since 1945. However, the highest yields in the postwar years are lower than the highest yields in the prewar period. Any number of reasons has been advanced to explain this failure to regain prewar productivity. Less chemical fertilizer is available at present. Lack of funds has postponed extensive development of arable land. The percentage of spoilage each year is high because storage facilities are inadequate. Serious losses have been caused by insects and blight. When these problems are solved, according to the Joint Commission on Rural Reconstruction, the yield per hectare can be increased, as follows:

	<u>Feasible Goals</u> (kg. /hectare)
Rice _____	2, 500
Sweet Potatoes _____	13, 000
Peanuts _____	1, 000
Sugar _____	10, 000
Crude Tea _____	500
Bananas _____	12, 000
Pineapples _____	14, 000

These goals represents increases in per hectare yield of amount varying between 10 and 50 per cent of highest yields achieved in

241/433 the postwar years. These goals can be attained without the expansion of present planted acreage and are more optimistic than the goals contemplated for 1956 in the Formosan Four-Year Plan.⁹

If the per unit yield can be increased and additional land is made productive, there is no reason why Formosa cannot substantially expand its yearly production. Rice is now planted on approximately 780,000 hectares of land; upon the completion of Shihmen dam and reservoir, it will be possible to grow rice on 835,000 hectares. If the yield per hectare is 2,500 kilograms, the total yield will be 2,100,000 metric tons, enough to feed 14 million people.¹⁰

IV. FARM MECHANIZATION

241/407 As in most undeveloped countries, agriculture in Formosa is conducted on a primitive basis. The average farmer has only

9. The Four-Year Plan, begun in 1952, is designed to bring about the economic independence of Formosa by increased production in agriculture and industry.

10. The Central Daily News, July 1, 1955.
(continued next page)

241 his strong back and a few simple implements.
407 If he is fortunate, he owns a water buffalo. The Taiwan Sugar Corporation owns 500 tractors, but this is the only large-scale use of farm machinery on the island. Mechanization would help to increase farm yields, but many difficulties are presented by the small size of the fields and the many natural obstacles to any plan which calls for the co-operative use of farm machinery. Moreover, private ownership of tractors or other modern farm implements is prohibitively expensive, and the farmer has no experience in repair and maintenance of such machines. On the other hand, water buffaloes are of value to the farmer as a source of fertilizer, meat, and hides.¹¹ Additional study is necessary to determine whether extensive mechanization of agriculture would be economical for Formosa.

V. DOMESTIC CONSUMPTION

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433 Formosa, as a rule, has produced sufficient agricultural products to meet the

10. (continued) The Shihmen dam and reservoir will increase the irrigated land in Formosa by approximately 55,000 hectares.

11. Norton S. Ginsburg, Economic Resources and Development of Formosa, New York, Institute of Pacific Relations, 1953, p. 38.

241
433 demands of domestic consumption. Surplus
rice is exported each year, and the supply
of vegetables is considered adequate. Meat
is expensive, and the ability to buy meat
[262] determines socio-economic position in
Formosan society. Data on dietary habits,
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433 caloric requirements, and so forth are not
available, probably because extensive surveys
have never been conducted on the island.
There is no way of ascertaining basic food
requirements to maintain a desirable
nutritional level.

433 The Provincial Food Bureau has estimated
the per capita rice requirement for civilians
to be 143.4 kilograms, and for the military,
308 kilograms. (These figures do not provide
for surplus storage, waste, spoilage, or
seeds.) Rice requirements for the next ten
years may be estimated as indicated in
Table 4. Note that the size of the military
force on Formosa is assumed to remain
constant (600,000).

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Since Formosa produces as much as 1,700,000 metric tons of rice each year, there is no reason why the island cannot maintain its present surplus until 1958, provided that nothing affects productivity. After 1958, there will be a shortage of rice, unless productivity is increased. If per hectare yield should be increased to 2,500 kilograms per year, and planted acreage expanded to 835,000 hectares, as has been projected in the Four-Year Plan, Formosa's annual rice supply will be sufficient for domestic consumption until 1965.

VI. MAJOR CROPS

24/43 The most important food crops produced on Formosa are rice and sweet potatoes. These two crops in 1953 accounted for approximately 60 per cent of total production (rice, 52.8 per cent; sweet potatoes, 7.2 per cent). Of special crops, sugar cane accounted for 13 per cent, vegetables, 3.2 per cent, peanuts, 1.8 per cent, crude tea, 1.5 per cent, tobacco, 1.2 per cent, and bananas, 0.8 per cent.¹²

12. Taiwan Agricultural Yearbook 1954, Taipei, 1954, pp. 30-31.

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The raising of hogs is Formosa's third most profitable endeavor, only surpassed by the annual crops of rice and sugar cane. Pork and fish are the major sources of protein in the diet of the islanders. The annual production of various agricultural produce is presented in Tables 5, 6 7, and 8.

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Table 5. Food Production*
(in 1,000 metric tons)

45:Stanford U. S-4, 5 1956 ADI Formosa
ADI

	Rice	Sweet Potatoes	Soybeans	Peanuts	Wheat
1937	1,319	1,770	6	32	1
1938	1,402	1,726	6	28	1
1939	1,307	1,279	4	28	6
1940	1,129	1,512	3	29	4
1941	1,199	1,693	3	22	7
1942	1,171	1,556	3	13	6
1943	1,126	1,406	3	10	2
1944	1,068	1,521	5	12	2
1945	639	1,165	2	12	1
1946	894	1,331	4	37	1
1947	999	1,783	10	47	4
1948	1,068	2,003	12	53	6
1949	1,215	2,166	12	53	10
1950	1,421	2,201	13	57	19
1951	1,485	2,021	13	61	15

ADI

1952	1,570	2,090	15	60	17
1953	1,642	2,277	17	60	14
1954	1,695	2,324	17	67	15
1955	1,633	2,290	24	70	19

* Data for the years 1937-53, from Foreign Operations Administration Mission to China, Taiwan Economic Data Book, Part II, Volume III, Taipei, 1955; for 1954, from Industrial Development Commission, Industry of Free China, Vol. 3, No. 4, April 1955, Taipei; for 1955 from the Central Daily News, February 3, 1956.

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Table 6. Commercial Production*

	Sugar Cane	Tea	Citronella	Jute
	(in 1,000 metric tons)			
1937	8,563	13	#	9
1938	9,061	13	*	14
1939	12,822	14	*	15
1940	9,977	12	273	11
1941	8,392	12	174	7
1942	10,250	12	319	11
1943	10,092	8	201	7
1944	8,468	4	35	4
1945	4,159	1	29	2
1946	1,007	3	12	1
1947	796	7	61	3
1948	3,116	8	213	11
1949	6,194	10	380	9
1950	5,861	10	762	7
1951	3,585	10	1,274	11

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1952	4,801	12	2,561	20
1953	8,394	12	2,527	5
1954	6,130	13	-	12
1955	-	14	-	19

* Data for 1937-53, Taiwan Economic Data Book, Part II, Volume III; for 1954, Industry of Free China, Vol. III, No. 4, March 1955; for 1955, the Central Daily News, February 3, 1956.

February 3, 1956 not available.

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Table 7. Production of Fruit*

	Pineapple	Banana	Citrus
	(in 1,000 metric tons)		
1937	108	219	33
1938	116	202	36
1939	146	182	35
1940	129	169	32
1941	130	191	39
1942	116	196	34
1943	94	142	29
1944	43	65	21
1945	18	32	17
1946	17	53	20
1947	40	124	25
1948	39	110	28
1949	43	98	27
1950	46	117	28
1951	52	100	27

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1952	63	107	28
1953	68	96	29
1954	62	109	31
1955	64	90	33

* Data for 1937-53, from Taiwan Economic Data Book, Part II, Volume III; for 1954, from Industry of Free China, Vol. III, No. 4 April 1955; for 1955 from the Central Daily News, February 3, 1956.

(Table 8 follows p. 550.)

Table 8. Production of Livestock*
(in 1,000)

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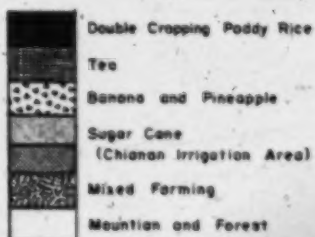
	Hogs	Cattle	Chickens	Ducks
1937	1,849	358	7,073	1,958
1938	1,827	325	7,095	2,023
1939	1,653	325	6,680	1,931
1940	1,205	300	#	-
1941	1,158	309	-	-
1942	1,358	312	-	-
1943	1,257	325	4,543	1,896
1944	862	331	3,837	1,358
1945	578	291	3,998	1,136
1946	768	280	4,555	1,647
1947	1,006	298	5,119	2,247
1948	1,167	310	4,525	1,985
1949	1,362	357	4,989	2,217
1950	1,620	365	5,143	2,547
1951	2,262	375	5,387	2,991
1952	2,611	383	5,593	2,912
1953	2,820	390	6,165	3,103

* Data on hogs and cattles are from Taiwan Economic Data Book, Part II, Vol. III; on chickens and ducks 1937-39, from Taiwan keizai nenpo 1941 [Taiwan Economic Annual 1941]; for 1943-53, from Taiwan Agricultural Yearbooks.

Not available.

[table 8 follows p. 550]

FORMOSA (TAIWAN) AGRICULTURAL REGIONS



[Facing p 56b]

ty to furnish their labor and then to give from their limited incomes to
y for the increasingly heavy fertilizer input that insured heavy yields
ree times a year from the same land. Taiwan was thus transformed into a
rden island where only the most venturesome of weeds could grow. Increas-
g quantities of rice, sugar and tropical products were transported north-
rd to meet the growing food deficits of Japan's increasing population.

PUBLIC HEALTH AND MEDICAL CARE

The Sanitary Bureau of the Police Department was the authority in pub-
c health. Administration and enforcement were supported by police power.
the prewar years there were about 2,000 qualified doctors. Many others
re trained in Taiwan and given local licenses. At the end of the war
ere were some 5,000 to 6,000 local doctors, or almost one per thousand
upulation. Since public posts and private practice were limited, many of
ese doctors were unemployed. In 1948 about 3,000 physicians were regis-
ered as engaged in private practice or public service. There were about
0 nurses and numerous midwives. In both these groups the majority were
etastandard in grade. The number of hospital beds included approximately
000 in the capital and perhaps 6,000 on the island, most of them in small
its. In 1948 effective hospital capacity was less than half this prewar
vel.

Under Japanese control plague was eliminated and cholera and smallpox
came rare, although the last two recurred in 1946 to 1947. Tropical dis-
ases are common, malaria in particular. The Japanese had a special malar-
service, based on extensive blood examinations, which administered quinine
positive cases. By these means 30 to 40 per cent of the people were ex-
ined annually and malaria mortality was reduced by treatment. This sup-
pression improved the health record temporarily, but it did not contribute
permanent amelioration. The program has since been largely discontinued.

INCREASE OF THE POPULATION

Population increase paralleled economic expansion. In 1905 there were
0 million people on the island; in 1940, there were 5.9 million. Popula-
on thus increased 93 per cent in this 35-year period and virtually all

this growth was due to the natural increase of the Chinese people. Density of settlement increased to 376 per square mile of total land area in 1935, and to 424 in 1940. This was a high density in a country where 70 per cent of all gainfully occupied men were in agriculture and cultivated land was limited to the river valleys of the northern tip and the fertile areas facing China. Industry was limited largely to the processing and transportation of agricultural products until the war preparations of the Japanese induced rapid industrialization and urbanization in the middle and the late thirties.

In this economic development, Japan's main interest lay in agricultural commodities which enabled her to be less dependent on sources outside of the Empire. The Japanese occupied the major administrative, technical and managerial positions while the Chinese comprised the farmers and the unskilled laborers. The latter were maintained in relative isolation from the outside world with minimum possibilities for economic or cultural advancement. However, an increasing proportion of the children of the island received elementary education and some even received a secondary education. A select few attended the Imperial University in Taiwan and went on to study in Japan. This cultural leaven was Japanese-oriented to a degree far beyond linguistic adaptation. In fact, the Japanization that had been in process of slow evolution since the initial conquest became a firm policy of forced cultural assimilation by the late thirties.

Here was a classical experiment in the potentiality of the Chinese peasant to reproduce his numbers under favorable conditions. Famines were eliminated and food available for subsistence increased in amount. Epidemics were controlled and the effects of endemic diseases were mitigated. All forces conspired to preserve and to sustain life in so far as possible with known technologies and at minimum cost. The same economic and political ideology insured the continuation of high birth rates. The familial values which had insured survival throughout the millennia in the rice lands of the Mainland were preserved in the isolated peasant villages of Taiwan.

THE DEATH RATE

The demographic paradox of colonialism appeared early in Taiwan. A combination of forces produced a decline in the death rate without either a concomitant or a delayed decline in the birth rate. Recorded death rates

matrix could easily have reduced death rates to 12 or 13 per 1,000 total population and, if birth rates had remained at 45, shot the rate of natural increase from 2.5 per cent per year to 3.0 per cent or more. 165
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THE BIRTH RATE

Neither the extension of cultivation, the increase of yields nor the health and medical activities in Taiwan produced any major changes in the familial patterns of the peasants. The recorded birth rate of the Chinese remained above 40. There were some slight evidences of a lower birth rate in the more prosperous and urbanized provinces, but the social and occupational groups that might have adopted the modern individual and familial values, rather than the traditional Eastern values, were few in numbers. 163

The growth implicit in the maintenance of fertility at the level that existed in Taiwan during the last decade of Empire was indeed rapid. The gross reproduction rate for the entire population was over 3.2 and the net rate over 2.0.

It is obvious that no population dependent on agriculture and inhabiting a limited and already densely settled area could reproduce indefinitely at the rate implicit in these figures. Potential growth was more rapid than the actual growth of the thirties, though, for any social and economic changes that would improve levels of living and contribute ultimately toward a reduction in fertility would produce immediate and more rapid declines in the death rate.

THE PROSPECTS: PREWAR JAPANESE VIEW

The balance between the people and the land in prewar Taiwan may have appeared precarious to the Western student but the Japanese foresaw many decades of further expansion before the Malthusian pressures of the people on the food supply would limit either population growth or exportable surpluses. Rice production had increased from 2.1 million koku in 1900 to 4.9 million in 1923 and 9.7 million in 1940. In the latter year the export surplus amounted to five million koku. By 1950 rice production would amount to 12.8 million koku and the quantity available for export to Japan Proper would increase by almost a million koku. 433
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The Japanese also realized that Asian hegemony implied a destiny beyond the agrarian for the once subject peoples and that Japan's own demographic

433 resources would have to be supplemented by the integration of Taiwanese and
241 Koreans into the industrial nexus of Empire.

439 THE CONTEMPORARY PROSPECTS

178 Today the plans of the Japanese for the further development of Taiwan
727 are somewhat irrelevant. The Chinese administration has penetrated every
aspect of political, social and economic life. Initially the transfer of
sovereignty resulted in sharp retrogressions. The great war industries
were destroyed. The Japanese army departed, but Chinese soldiers from the
Mainland now use the island for training to repel an invasion expected from
the Mainland. The land is cultivated but the agricultural supervisors have
been repatriated to Japan. In October, 1948, when we were in Taiwan, there
were markets for surpluses that would yield funds to purchase the fertiliz-
ers essential to the maintenance of production. Disease and premature mor-
tality were reported to be increasing. All this was descriptive, for sta-
tistics were a casualty of the liberation. Bureaucrats and university pro-
fessors had been moved back to Japan and Japanese policy had produced to-
tally inadequate numbers of Taiwanese to take their places.

177 The political travesty of the Chinese liberation of the Chinese popu-
198 lation of Taiwan needs no recapitulation. It placed almost insuperable ob-
stacles before even the most reasonable programs and the most capable ad-
ministrators. Furthermore the Taiwanese were now a peculiar Chinese-Jap-
anese cross-product and the cultural heritage of the half century of occu-
pation complicates all aspects of Chinese-Taiwanese adaptations. The Tai-
wanese spoke Hakka or Fukienese, neither comprehensible to the other; the
Mainland Chinese spoke Mandarin, which was incomprehensible to the Tai-
wanese who spoke either Hakka or Fukienese. So Japanese became the lingua
franca between Chinese groups.

Had Taiwan been reintegrated into a functioning Republican China it
seems probable that inundation from the Mainland would have reduced the Tai-
wanese to Chinese levels of living and absorbed their particular population
problem into one of the greatest of all population problems, the demographic
prospects of a modernizing and industrializing China. Today the future of
the Taiwanese people is unpredictable. They are again pawns in a struggle
for control of the East.

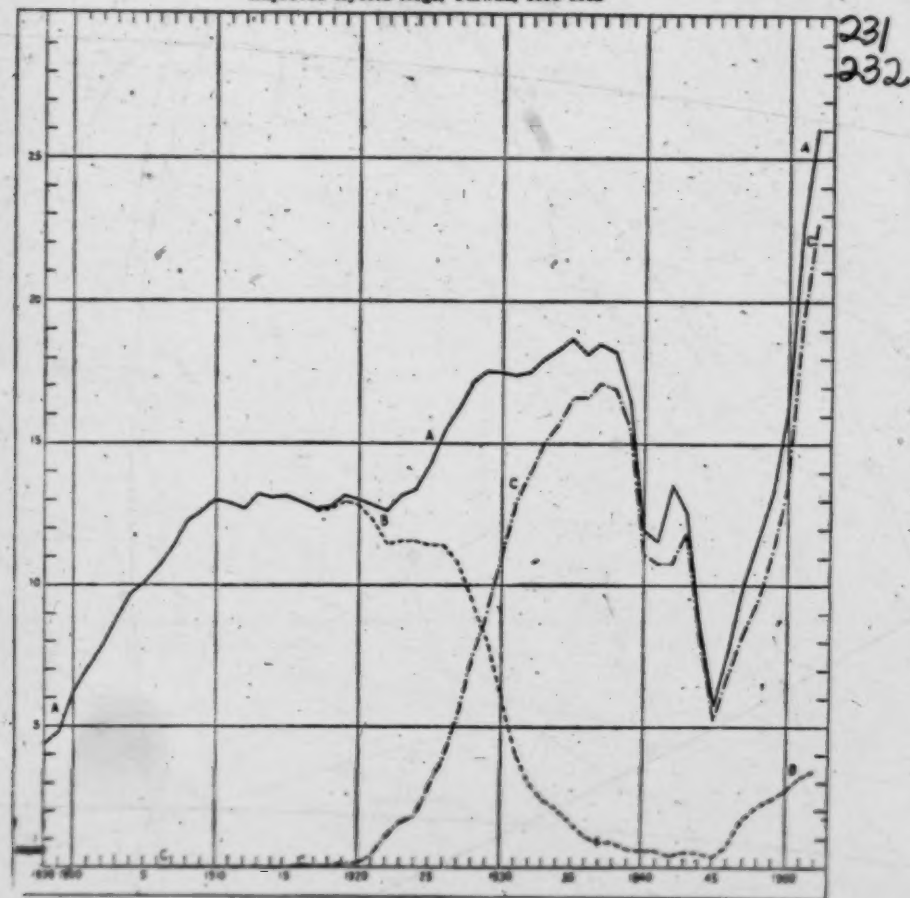
181 matters of sanitation, and at times on matters of agriculture. With the passage of
 178 time, experience lead them to compare their traditional way of life with that imposed
 by the colonial government. Some of these ways were found to be not too bad, some
 even adoptable. This kind of change in attitude through hard experience was fairly
 significant. By this, people realized for the first time that there were another ways of
 life besides their traditional one, and that some elements were worthy of adoption.
 Once the people began to adopt the new way of life, change began to speed up. From
 the following instances we can see that change in the attitude of people became
 conspicuous after the 1920's. We have discussed the influence of war and peace, the
 prevalence of epidemics, and the development of transportation on the attitude of the
 people (§ 7, 8, 12). Here the change of attitude concerning medical treatment and
 agriculture will be discussed.

178 Since treatment of illness touches the innermost part of life, it is only natural that
 744 conservative people do not dare to allow an unfamiliar doctor with strange ways of
 156 treatment to approach them. For Taiwanese, who had been accustomed to the tradi-
 tional Chinese medicine and folk medicine, doctors of western medicine, particularly
 with their injections and operations, were dreaded. During the early years of the
 Japanese rule there was a prevalence of cholera. Colonial officers compelled the people
 to take the preventive injection. Great consternation arose among the people, and
 many of them, particularly young girls, escaped and hid, in order not to have the
 dreaded injection. In the old city of Tainan a young girl of a wealthy family was
 escaping in a palanquin, but unfortunately she was caught by a Japanese police on the
 way, and forced to take the injection. Perhaps because the shock was too great, she
 died in a short time. Another young girl who took the injection killed herself after
 she went home, because it was a dreadful shame for a young girl of high standing to
 expose a part of her body to the public gaze. When a person died, his family had to
 have a medical certificate in order to get permission for burial. In 1906 90% of the
 medical certificates were issued by doctors of Chinese medicine, and certificates issued
 by doctors of western medicine constituted only 10% of the total. The proportion of
 175 the latter increased gradually, attained to 45% by 1917 (11:1917, p. 29). By 1920, the
 number of doctors of western medicine already exceeded those of Chinese medicine,
 and by 1935, 90% of medical certificates for the dead were issued by doctors of western
 medicine. Thirty years after 1906, doctors of Chinese medicine and doctors of western
 medicine had changed positions completely. By 1935, people did not object to injections
 and operations any more. On the contrary, they even believed blindly in injections, and
 asked for an injection when they saw a doctor. This was a remarkable change in
 attitude.

178 Farmers are tenaciously conservative in their work. In Taiwan, farmers originally
 241 used only compost and night-soil, and did not use any commercial fertilizer. When
 a sugar corporation started to promote the cultivation of sugar cane, they bought com-
 mercial fertilizer from Japan, and distributed it free of charge to farmers. Once s

farmer received some bean cake for fertilizer. However he was afraid that this new and strange material would hurt his crop, so he threw it away in a grove of bamboo. Later he found that the bamboo around the bean cake had shot up tremendously, and he realized for the first time that commercial fertilizer was useful, and began to use it on his crops. It is not an easy task for the conservative farmer to depart even a little from his traditional way of life, and experiment with new methods. But when once the experiment is begun, new experiences will lead him farther. The use of commercial

Fig. 10: Total Number of Hogs and the Number of Native Hogs and Improved Hybrid Hogs, Taiwan, 1896-1962



Unit: 100,000 head A: Total Number B: Native Hogs C: Improved Hybrid Hogs

Source, 1896-1950, from Animal Resources of Taiwan, pp. 36-39

1951-1962, from Taiwan Agricultural Yearbook, 1962

241 The use of commercial
178 fertilizer spread quickly, and with textiles, became one of the main items of import

239 from Japan.

232 For the improvement of hog raising, the colonial government had imported Berkshire hogs from Japan in 1896, and Yorkshire hogs from England in 1900. After a series of experiments, it was found that the first generation of hybrids between the native hog and Berkshire hog was most suitable to Taiwan, and the promotion of the hybrid was started in 1907. As in other agricultural practice, the traditional way of hog raising was a complicated procedure. Many religious and magical elements were involved in it, and it was not easy for the conservative farmer to adopt the profitable new hybrid. It took more than ten years of government promotion before people became willing to adopt the new hybrid. After 1920 more and more people adopted it, and the number of native hogs declined sharply (Fig. 10). This is the best instance of change in the attitude of the people. A new strain of rice (Ponlai rice) has been extensively cultivated since 1924, and the output of rice has sharply increased.

178 The 1920's is the turning point in the social history of Taiwan. Epidemics were wiped out, prevention of malaria had improved, the doctors of western medicine exceeded the doctors of the Chinese medicine, and even the cattle pest was wiped out. Political and social movements began for the first time. Primary education spread wider, the conservative farmer began to adopt new strains and new technics, and increase production. Mobility of the people had increased, more bicycles, automobiles, and trucks were used, and the level of living was raised somewhat. It was amid this social milieu that Taiwan's death rate steadily declined while its already teeming population with equal steadiness rose to new heights.

CHAPTER II

"Economic Development" in Taiwan

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433 RULING TAIWAN was a task that the Japanese approached with high hopes. Because their goals were ambitious, the problems were more formidable than they might have been with a more modest and conventional colonial program. Their officials in Taiwan were the first overseas administrators in the Empire, and felt a responsibility to make the colony appear worth while at home.¹ Whatever their wider aims, their strongest aspirations for the island expressed themselves in energetic economic policies—policies pursued with such determination that they profoundly altered many aspects of Taiwan's economic life. In the course of their administration, Japanese nationals came to look upon enhanced production with a two-fold purpose: to secure profits for certain individuals and groups, and to promote the self-sufficiency and military strength of the Empire.

Here we shall examine the techniques of their economic program, survey its operation, and endeavor to make some appraisal of the accomplishments. A closer view of its significance for the everyday affairs of the population is reserved for the next chapters.

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433 The situation that the Japanese first encountered in Taiwan was one of long-established tradition, in which a small amount of innovation could go a long way. Agriculture was the main source of livelihood for practically all Taiwanese. The particular manner in which farming is organized in Taiwan tends, as it does in most of the Far East, to shield it from the intrusions of the modern world. Under the Manchu regime the Chinese inhabitants of Taiwan had developed farming along the familiar lines of their forebears on the China coast. Farms existed on a local village scale and were operated for local subsistence. Most of any exportable surplus of production was removed from the villages in the form of taxes or rent. What was left became absorbed in the costs of civil disturbance, misgovernment, and expansion of settlement, rather than going toward broadening commercial or other opportunities of the cultivators themselves.

433 Whatever may bring about such a situation, it is one that tends to

¹ Most of the later Japanese publications about Taiwan's future also stressed the island's potentialities as a base for southward expansion of the Empire. The grandeur of these proposals suggests that some of them may have been invented in search of favor for their authors more than in serious expectancy of being carried out.

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"ECONOMIC DEVELOPMENT" IN TAIWAN

The most efficient view of total changes in the island's economy is by reference to its statistics of trade. As indicated above (Table 4)¹ Japan succeeded in securing practically all of Taiwan's external trade to itself, if exports to Korea are counted. During the 1930's even traffic with China, just across the Straits, was almost eliminated.

Compared with a wide range of other Far Eastern countries, Taiwan under the Japanese came to hold a surprisingly high rank in the value of trade per person. At its peak shortly before 1940, the total per capita value of its trade was well above even that of Japan (see Table 5). Since this rank was attained under peculiar conditions,

TABLE 5
ESTIMATED PER CAPITA VALUE OF FOREIGN TRADE
OF FAR EASTERN COUNTRIES
CIRCA 1939*

(Expressed in U.S. Dollar Equivalents)

Country	Year	Imports	Exports	Total
New Zealand	1939	109	127	236
British Malaya	1939	61	72	133
Australia	1938-39	67	64	131
TAIWAN	1937	16	23	39
Korea	1939	15	11	26
Japan Proper	1939	10	13	23
Philippine Islands	1939	8	10	18
Burma	1938-39	5	12	17
Netherlands East Indies	1939	4	6	10
Thailand	1938-39	4	5	9
French Indo-China	1937	3	4	7
China	1939	0.85	0.25	1

* As reproduced in OPNAV, Civil Affairs Handbook. *Taiwan—Economic Supplement* (1944), p. 73.

Source: Far Eastern Unit, Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce.

however, it does not mark Taiwan as an especially "advanced" area (in the sense of supporting bountiful levels of living) except by reference to the Japanese residents in the island.

Taiwan's position in trade with the outside world was created by heavy and increasing exports of a few products, mainly crops sent abroad in only slightly processed state. Compared with what took place in Taiwan's business and financial communities, there was remarkably little shift in the composition of its agricultural output

"ECONOMIC DEVELOPMENT" IN TAIWAN

241 (see Fig. 4). Together sugar and rice never lost their dominant position in the value of all crops produced. Despite some greater emphasis on finished sugar as a source of alcohol, the cane harvests gained very little in value over rice, even when the expansion of manufactures after 1935 would seem to have made this likely. In these terms sweet potatoes, which were always prominent in the Taiwanese diet, kept nearly a constant share of the total.

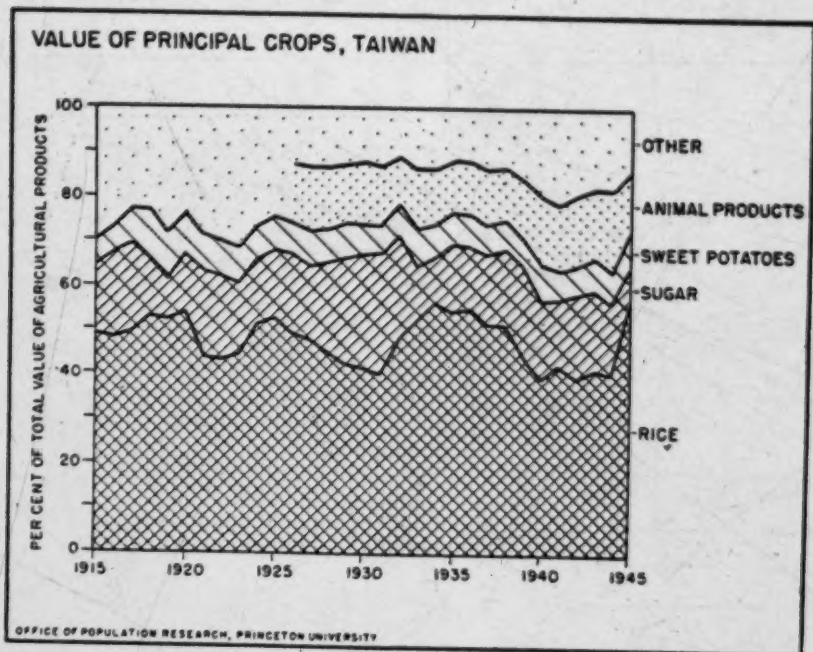


Fig. 4. Composition of the Gross Value of Total Agricultural Production, Principal Crops of Taiwan, 1915-1945.

Japanese promoted certain specialty crops, such as bananas and pineapples. These never occupied a large share in the total output of agriculture, but they more than kept pace with trends in the major crops (accounting for some of the change in the proportion of "other" products in Fig. 4). Together with tea, these crops made use of land not suitable for rice or sugar, and became important supplements to the total agricultural output. The Japanese encouraged such products by providing assured markets and technical supervision in their cultivation, and built canneries to process pineapples for export.

"ECONOMIC DEVELOPMENT" IN TAIWAN

The various staple and other crops that made up the bulk of Taiwan's agriculture eventually became distributed in a stable spatial pattern over the island. Sugar predominated over a large area in the Southwest, where it displaced rice in most of the land within the major public irrigation system. Tea in the North, and other specialty crops in the center, occupied some of the inland and foothill sections.³⁰ But it is important to note that rice culture, particularly in small paddy fields, overlapped with all other crops that were raised on the broad plain of Taiwan, and the labor-intensive and traditional farming practices associated with it have continued to be spread throughout Taiwanese agriculture down to the present.³¹

The exports of staple crops would not have risen as they did unless the yields of crops did the same. Gains in rice yields from the land did not come at once. They followed almost 20 years of painstaking experiment, starting in 1906, to find a strain of seed that could thrive under conditions in Taiwan. Almost no improvement was made until the so-called *horai* variety was successfully adapted from Japan. Following its introduction the average yields per hectare for all varieties gradually rose as much as one-fourth, primarily by growth of the area devoted to *horai* rice and the special techniques used in its cultivation. Neither the *horai* nor the native strains were greatly improved in yield thereafter; in fact, it appears that *horai* declined slightly from its high performance at the start as it spread to land less favorable than the experimental farms where it was first grown (see Table 6).

Systematic irrigation was one of the measures that raised the yields of land. Between 1930 and 1936 a few projects were carried out, by the government and by private companies, to introduce controlled amounts of water into lands that previously had been cultivated as dry fields. To illustrate approximately the trend of these events, Fig. 5 shows the changes in the area of land in paddy cultivation and that in dry fields. (Paddy land does not correspond exactly with the land that is irrigated on a large scale, for there were many paddy fields not included in these projects.) Since the total area cultivated was increased over these years, it is possible that the irrigation projects brought some land into cultivation that was formerly idle. More, however, was merely converted from dry to wet cultivation (see Fig. 5).

³⁰ See Ch'en Cheng-hsiang, *Atlas* (1950), Fig. 161.

³¹ *Ibid.*, Fig. 70.

"ECONOMIC DEVELOPMENT" IN TAIWAN

TABLE 6

IMPROVEMENT IN THE YIELDS OF RICE IN TAIWAN, 1916 TO 1945

Average Yields of Different Strains in Each Year,
First and Second Crops Combined
(Hectoliters of Rice per Hectare)*

Years	All Rice	Horai Rice	Other Strains	Per Cent of Rice Land Devoted to Horai
1916-20	17.8	—	20.1	—
1921-25	19.3	28.5	19.3	4.6
1926-30	20.9	22.7	20.4	19.9
1931-35	23.0	27.2	21.3	33.7
1936-40	25.5	28.2	23.2	47.3
1941-45	21.6	22.7	19.7	59.8

* Crop statistics in Taiwan were not kept in metric units. Figures in the *Statistical Summary of Taiwan* were all converted before publication.
Source: *Statistical Summary*, Table 203.

LAND CULTIVATION, TAIWAN

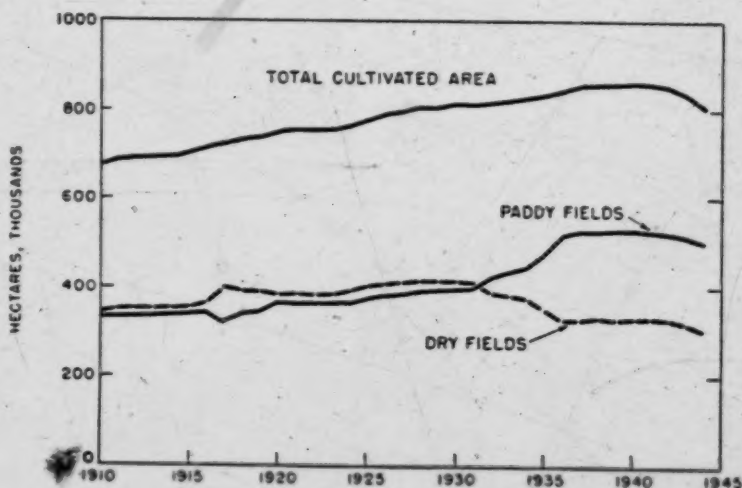


Fig. 5. Area of Cultivated Land, Taiwan, 1910-1944.

"ECONOMIC DEVELOPMENT" IN TAIWAN

Land that was improved in this manner not only yielded more at each harvest: over a third of the paddy land yielded more than one harvest each year. Under schemes for rotation and inter-cropping devised by the Japanese, it was not unusual to take three separate harvests from many of these fields in a year. 241 • 433

The labor of preparing the land, of weeding, and of harvesting was not saved by these changes. They may have involved some net additions—irrigation became a more complicated process, in some cases, and the aqueducts for transporting the water required special maintenance. Japanese were aware that the soil could not be farmed more intensively without losing some of its fertility, and encouraged the use of commercial fertilizers, much of which they required to be prepared on the island. The remainder comprised the largest single category of Taiwan's capital imports, greater in value than the iron and steel and machinery which are sometimes identified with the needs of agrarian countries. Importing fertilizers for sale in Taiwan proved to be a profitable line of business; it was reported to be firmly in the hands of a few large Japanese concerns, a fact which should occasion no surprise. It was shortage of fertilizers that brought on declines in average yields of crops after 1940 (see Table 6, above). [427]

The shift in official plans for Taiwan after 1930 leads one to look for some indication of results in the composition of Taiwan's products. The search is not very rewarding. In terms of gross value of product, agriculture did not lose its place as the foremost line of production until 1940 and later. Then it exchanged ranks with "Industry"—because farm produce fell off momentarily rather than because of any sharp rise in manufacturing (see Table 7).²² The steady but slow decline in the share of agricultural production in earlier years had indicated a tendency to submit more of the agricultural produce to processing before it left the island, and not a shift from farming to manufacturing. 433

It is when the category of "industrial" production is examined in detail that some of the more recent trends emerge. In Table 8, evidently industry in Taiwan had always been centered around food products. Until the mid-thirties these had amounted to three-quarters of the value of all manufactures. Only from then on did the effects of new economic goals begin to appear. The largest advances were made in some of the fields that had been smallest, espe-

²² The sharp rise in the numbers of Table 7 was largely a matter of currency inflation.

"ECONOMIC DEVELOPMENT" IN TAIWAN

TABLE 7

GROSS RECORDED VALUE OF ALL PRINCIPAL TYPES OF PRODUCTION,
1915-1942

(Yearly Average for Each Period)

Years	Total	Agriculture	Mining	Fishing and Forestry	Industry
A. Millions of Yen:					
1915-19	262.7	144.5	7.2	9.1	101.9
1920-24	411.5	207.0	12.0	23.0	169.5
1925-29	559.0	293.6	16.8	31.8	216.8
1930-34	525.5	255.8	15.5	26.5	227.7
1935-39	901.0	432.9	39.6	41.5	387.0
1940-42	1388.4	576.4	62.8	91.8	657.4
B. Percentages of Total:					
1915-19	100.0	55.0	2.8	3.4	38.8
1920-24	100.0	50.3	2.9	5.6	41.2
1925-29	100.0	52.5	3.0	5.7	38.8
1930-34	100.0	48.7	3.0	5.0	43.3
1935-39	100.0	48.0	4.4	4.6	43.0
1940-42	100.0	41.5	4.5	6.6	47.4

Source: Statistical Summary, Tables 225-229.

TABLE 8

GROSS VALUE OF PRODUCTION RECORDED FOR "INDUSTRY"
IN TAIWAN, BY LINE OF PRODUCT, 1921-1942

(Yearly Average for Each Period)

Years	Total	Textiles	Metal Products	Machinery & Equip.	Misc.*	Chemical Products	Food Products
A. Millions of Yen:							
1921-24	165	3	3	4	20	13	122
1925-29	217	3	4	5	32	20	153
1930-34	228	3	6	5	29	18	167
1935-39	387	6	17	12	45	38	269
1940-42	664	11	46	30	91	80	406
B. Percentages of Total:							
1921-24	100.0	1.7	1.9	2.1	11.9	7.9	74.6
1925-29	100.0	1.5	2.0	2.2	14.7	9.3	70.3
1930-34	100.0	1.1	2.5	2.3	12.9	7.8	73.3
1935-39	100.0	1.5	4.5	3.1	11.6	9.9	69.4
1940-42	100.0	1.7	7.0	4.5	13.7	12.1	61.0

* Includes Printing, Wood Products, Ceramics, and Other.

Source: Statistical Summary, Table 269 and Table 270.

CHAPTER III

Economic Activities and Social Change

THE activities, interests, and aspirations of the Japanese community in Taiwan were things that existed apart from the indigenous population. These elements were never effectively communicated to the Taiwanese—partly through a design to withhold them, and partly through reluctance among the people of Taiwan to accept them. Consequently the conduct of Japanese residents is not of much help in understanding the accustomed modes of life among the island's people. It is the latter problem that has the more interest for demography, and makes it essential to consider the background of social order in Taiwan and the changes under colonial rule. 178

The Early Agrarian Order in Taiwan

The importance of agricultural pursuits in imposing a predominantly agrarian character on a society is not a thing that can be precisely measured. Short of perfect exactitude, a great deal can be learned with lesser devices, by describing the cultural setting of agriculture in Taiwan, and pointing out how it influenced the participation by Taiwanese in the island's economy. The basis of this setting lay in the conditions that prevailed before Taiwan became a colony of Japan. 167 241 511

By the mid-19th century, the lowland region of Taiwan was rapidly becoming fully settled. Piracy, which had made Taiwan a scourge to sea traffic along the China coast, gradually subsided into sedentary agriculture. Most of the Chinese population was already supporting itself by farming and the marketing of farm products. Since 1700 immigration had brought in a steady stream of Chinese from the mainland. In spite of sporadic prohibitions, hundreds of thousands of peasant farmers came to seek refuge from rural poverty in South China. Once arrived, they often reverted to this same condition, by reaching unfavorable terms with some of their countrymen already entrenched there as land speculators.

Poverty tended to reproduce itself among those who reached Taiwan, though there was also great wealth open to the few who rose from cultivation to commerce. Each settled family held an advantage over newcomers. This superior position placed new migrants in 167 563 423

ECONOMIC ACTIVITIES AND SOCIAL CHANGE

the land area that yielded crops. From 34.2 per cent of all "level" land (under 500 meters elevation) in 1910, this area cultivated was raised to 43.7 per cent by 1940. The *effective* crop area was extended still further by irrigation, terracing and careful crop rotation. Irrigation converted many dry fields into paddy fields, as we found in the previous chapter. Improvement in irrigation made more of the paddy fields yield two or more crops each year (see Table 9). Evidently

TABLE 9

SPREAD OF DOUBLE-CROPPING IN IRRIGATED FIELDS, 1917 TO 1945

Area of Paddy Fields That Was Double-Cropped in Taiwan

(Thousands of Hectares)

Yearly Average in Each Period

Years	Total Cultivated Area	Area in Paddy Fields	Area of Double-Cropped Paddy Fields	Per Cent Double-Cropped:	
				of Total Cultivated Area	of Total Paddy Area
1917-1919	730	336	217	29.7	64.5
1920-1924	753	366	252	33.4	68.7
1925-1929	795	386	274	34.4	71.0
1930-1934	816	422	300	36.8	71.2
1935-1939	850	516	320	37.6	61.9
1940-1944	844	520	314	37.2	60.4

Sources: *Statistical Summary*, Table 196.Ch'en Cheng-hsiang, *Land Utilization in Taiwan*, Appendix, Table 2.

much of the advance in crop production took the form of increasing the number of harvests from land already cultivated, which in Taiwan was already the "highest in the [Japanese] Empire."¹⁴

Land was not the only element of agriculture that was put to harder use. With a few exceptions,¹⁵ cultivation continued to be carried on with little difference in ways of applying human labor to the land. Agricultural implements were improved, but remained similar in design; irrigation facilities opened new land, but their construction was itself labor-intensive; transplanting of rice became generally practised to save land, but it is inherently a very laborious process. One of the major problems of farmers in the Far East has long been that their work is distributed unevenly throughout the

¹⁴ Nasu, Shiroshi (1941), p. 96.¹⁵ A few large-scale plantations experimented with the use of tractors in raising sugar cane.

ECONOMIC ACTIVITIES AND SOCIAL CHANGE

241 year.¹⁶ Double cropping fields not only uses land more intensively, but does the same for labor by spreading the intervals of greatest effort over a longer part of the year¹⁷ (see Table 10).

TABLE 10.
LABOR REQUIREMENTS FOR RICE CULTIVATION IN TAIWAN
Average Man-Hours Worked for One Chia of Rice*

Type of Work	First Crop		Second Crop	
	Man	Man with Animal	Man	Man with Animal
Seed Bed	6.3	0.8	1.9	1.4
Preparing Land	22.6	18.1	15.1	11.9
Transplanting	11.1	0.1	10.1	0.1
Fertilizing	7.1	0.9	4.0	0.1
Weeding	29.6	0.4	23.9	0.2
Irrigating	9.6	0.0	6.8	0.0
Pest & Disease Control	1.0	0.0	1.6	0.0
Making Windbreaks	0.1	0.0	1.8	0.0
Harvesting & Threshing	25.9	0.2	27.5	0.5
Total	113.2	20.5	92.7	13.1†

* Women's time was counted as 60-70 per cent of that of men, children's as 30 per cent. Figures represent averages from 36 farms, having a mean size of 1.6 chia. (1 chia = .96992 hectare) Table has no date.

† Published total does not check with sum of column.

Source: Mendiola, N. B. (1949), p. 72.

433 241 The data drawn upon thus far give no indication as to whether harder work and better techniques meant higher yields to farmers as well as to land. Fig. 9 helps in a rough way to settle the question. The number of farmers increased relatively more than the land area devoted to farms. It follows that the average gains in crop yields per person fell short of the gains in the yield of land. Fig. 9 also shows crudely the trends in the productivity of farmers, taking into account the major crops of Taiwan. They were unmistakably upward until

¹⁶ If small-scale household farms are subject to two or three peak periods of work each year, shortages of labor tend to appear seasonally. When the seasons coincide for all or many farms, the shortages become general and cannot be met by hiring workers, since other available manpower is also in great demand. To maintain a household large enough to cope satisfactorily with this problem, the goal cherished by most peasant families is usually to bear the burden of supporting members who may not be fully occupied for the rest of the year.

¹⁷ The net effect of double-cropping may even be to increase the amount of labor that goes into a given amount of output. However, some of the steps required to produce two crops where only one had been grown before are labor saving, i.e., involve the use of capital. The question of precise trends is too complicated to deal with here in these terms.

ECONOMIC ACTIVITIES AND SOCIAL CHANGE

CROP PRODUCTION, TAIWAN

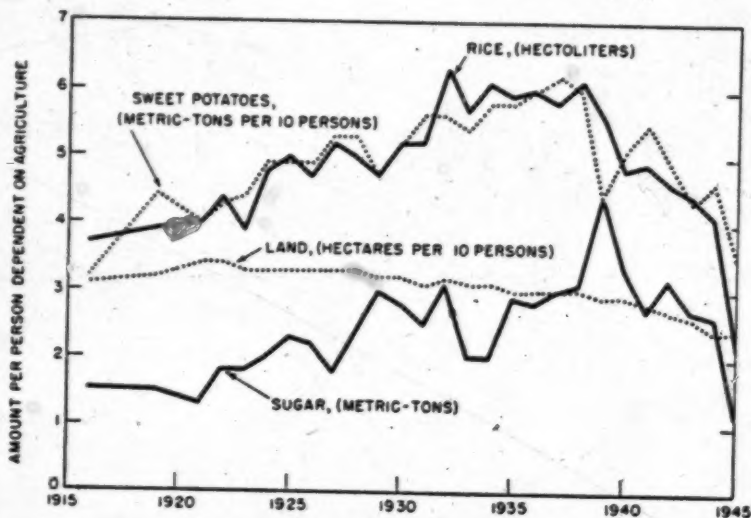


Fig. 9. Crop Production and Cultivated Land Per Person Dependent on Agriculture, Taiwan, 1916-1945.

the time of the war. But, considering the steady rise in the population dependent on agriculture, it is clear that the increased effectiveness of land use (discussed in Chapter II) did not owe so much to their colonial program as the Japanese themselves liked to believe. In part, it was merely a matter of more people working on the land.

Fig. 9 is based only on rice, sugar and sweet potatoes, and makes no allowance for the spread of some other crops during the late 1930's. In actual volume of crops produced, the product per person in agriculture therefore must have risen slightly more than the data imply. Diversification of this sort was of small benefit to most Taiwanese. Specialty crops like bananas and pineapples held a significance for the economy as a whole (they were export crops) greater than for individual farmers. Pineapples, for example, were grown entirely in plantations, and not by peasants as supplemental crops.

Trends in rice and sugar output were the trends for the rural economy as a whole; sweet potatoes are worthy of note because they

ECONOMIC ACTIVITIES AND SOCIAL CHANGE

433 have always supplied a large part of the Taiwanese diet. How well
 241 these three basic crops represent the whole of Taiwanese agriculture
 may be seen from their share in the total recorded value of farm
 produce (see Fig. 4).¹⁸

241 The spatial arrangement of crops discussed in the previous chap-
 621 ter has an important bearing on the question of persistence in or-
 ganization of agriculture. Rice fields were found throughout the flat
 lowland area, overlapping in every civil division with the other types
 of farming. In its import for the nature of the rural society, this
 fact overshadows most effects of diversification and rationalization of
 farming. The types of social system that can give rise to paddy cul-
 tivation of rice seem to be uncommonly well equipped to resist
 change. They are centered around settled family relationships that
 provide for uninterrupted use of suitable fields over many genera-
 tions. This is the case throughout most of the paddy-rice areas of
 Asia, where these conditions resemble what is to be found in Tai-
 wan.¹⁹ Hence, from this stability within farming itself, one should
 not expect to find that its social setting was greatly different as a
 result of Japanese occupation.

Changes in Pattern of Employment.

463 Farming is so important to Taiwan that it has first been treated
 separately, with very little reference to its place among other activi-
 ties. By viewing it in relation to the pursuits of the entire working
 population, we can take into account the nature of alternative op-
 portunities outside of agriculture.

¹⁸ There would not be much point in looking for possibilities of
 non-agricultural employment if the economy could not have sup-
 ported a larger proportion of people in other activities. This is where
 many agrarian countries have felt the effect of poverty to stand in
 the way of their industrial progress. From the start of its modern
 era, Taiwan's peculiar status as a food exporter suggests that food
 supply was no barrier. Since that time, special diligence in the mat-
 ter made land and human effort more effective in producing crops.
 Advancing both of these aspects of productivity implied that at least
 some movement of people to pursuits outside of agriculture, was
 economically feasible.

¹⁸ These trends, of course, indicate nothing about "well-being" of farmers, since large
 capital charges (for irrigation, fertilizer, and government administration) were being
 made against farm incomes.

¹⁹ See Taeuber, Irene B. (1947), pp. 21-43.

THE SETTING

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With the advent of the Japanese in 1895, Lukang very soon lost its importance as a port, for Japan's plans for the colonization of Taiwan did not include maintaining Lukang as a trade and immigration center. The Japanese set about cutting off the movement of people and goods between Taiwan and the mainland, and, to divert the colony's trade from China to Japan, they built the port of Keelung in northern Taiwan (Barclay, 1954b:12, 18-42). The demise of Lukang both as a port and as a major urban center was hastened by the silting up of the harbor, which had begun even before the coming of the Japanese. As a result of Japanese indifference to Lukang as a port, the harbor soon became unusable.

The final blow by which the Japanese doomed Lukang's importance was the routing of the extensive west coast railroad system far from Lukang. The city could then neither be maintained as a major market town nor as a point of trans-shipment for the area's produce. Its decline as an urban center and as an influence on the surrounding area was reflected in an accompanying population decrease from one hundred thousand in the late eighteenth century to fifty-one thousand in 1954 (*Women in Lukang Chen*, 1954). The decrease took place despite the high rate of population growth in the rest of Taiwan.

Today, Lukang stands several miles from the sea, a city much diminished in size and importance. It offers little economic opportunity for its inhabitants, and despite some light industry, few village people are employed there. Nevertheless, although it is now a small, out-of-the-way city, it offers nearby villagers a convenient local marketplace and a center for some entertainment. Most important, it still functions as a religious center. From the earliest times the Chinese immigrants brought their gods with them from the mainland to Taiwan. These gods and goddesses, such as Matsu, became firmly established as important deities in Taiwan; the Matsu temple in Lukang is believed by the people of the area to be the oldest or second oldest Matsu temple on the island. For this reason Lukang is still one of the most important focal points for the religious pilgrimages of those who maintain loyalty to the Goddess Matsu.

The historical picture of this area at the time of the late Ch'ing dynasty comes from data furnished by older or better educated residents of the area and several local Chinese and Japanese gazetteers.³ These various sources were used, wherever possible, to corroborate one another. The sources note that in the late nineteenth century the area was sparsely populated and that its inhabitants lived in constant fear of bandits. Up to the early part of the twentieth century dry farming produced most of the staples grown, since there was only a very limited system of irrigation. Crops like wheat, soybeans, sorghum, sweet potatoes, peanuts, a plant used to make dye for cloth, and broom grass were

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1:Gallin E-4,5 (1957-1958) 1966

AD5 Taiwan Hokkien AD5
Formosa AD1

16

THE SETTING

the main products. Rice growing played little part in the economy. The almost total lack of irrigation, presumably combined with a high mortality rate, prevented any rapid increase in population. There were not even enough people to exploit the land fully.

The present area of Hsin Hsing was at that time the site of only a few scattered households. The inhabitants were so few and so weak, and the bandits so many and so strong, that Hsin Hsing and eleven nearby villages formed a mutual protection association. When a village was attacked by bandits, it sounded large gongs as an alarm signal; the signal was relayed from village to village, and the able-bodied men rushed to the aid of the community under attack. The associated villages still maintain an informal organization today, though its function is now the production of a joint annual religious procession (which will be discussed in Chapter 8).

The coming of the Japanese to Taiwan had major repercussions not only for Lukang but for the Hsin Hsing village area generally. Once their rule was established on the island, the Japanese moved quickly to bring about law and order by suppressing the bandits. They eliminated the lawless element from the countryside and brought new security to the village people.

The Japanese also took in hand the extreme complexities of a tri-level land tenure system of landlords, tenants, and subtenants. (See details in Chapter 4.) In order to establish clear property rights and increase the efficiency of tax assessment and collection, the Japanese carried out extensive land surveys from about 1898. In 1905 the "Land Investigation Regulations" were promulgated; they resulted in a greatly simplified land tenure structure which included only landlords and tenants. This basic system is still in force today. Even in more recent years, although the Land Reform Program of the Chinese Nationalist government modified the internal content of the land tenure structure, its form has remained roughly the same.

At the same time, the Japanese gradually extended the irrigation system to serve much larger areas (see *Pu Yen Chuang Yen Ke Chih*) as part of their effort to integrate the colonial area of Taiwan into the Japanese economy. The development of a major irrigation system enabled the agricultural population to expand its rice production greatly, and this rice ultimately became its major export to the Japanese homeland (Barclay, 1934b:18-42).³

The expansion of the irrigation system, accompanied by a greater emphasis on agriculture in the area, occurred at about the time that the main impact of the closing of the port of Lukang began to affect the villagers, who thus lost the opportunity to supplement their livelihood by working in the port. The increased irrigation meant that wet-rice could be planted profitably. Wet-rice production demands a

1:Gallin E-4,5 (1957-1958) 1966

AD5 Taiwan Hokkien AD5
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THE SETTING

greater labor force, and this absorbed the men who had formerly worked in Lukang.

The expanded area of land under cultivation increased the food supply and generally improved the standard of living. In addition, the Japanese introduced some Western public health ideas and new means for controlling disease. Apparently, these factors are closely related to the extensive population growth which then began to take place in Taiwan. The Japanese also improved the primitive communication systems of the area. A major program of electrification and improvement of rail and bus lines was instituted throughout the heavily populated areas of the island.

The material influence of the Japanese occupation and administration of Taiwan was enormous. Not only did Japan create in Taiwan an important element of its colonial empire but in so doing it indirectly began to produce important economic changes which had implications for the development of the rural areas and the island itself. While agriculture provided the major portion of Taiwan's exports to the home country, new, imported commodities also became readily available to the Taiwanese villager at low prices; many inexpensive canned foods became common in the village household. In spite of these changes, the world depression had apparently little effect in the Hsin Hsing area. In fact, few villagers were even aware that there was a world depression in 1929 and in the 1930's, which may be due to the almost total lack of industry in rural Taiwan or in Taiwan generally at that time.

The advent of the Japanese brought a higher standard of living for the Taiwanese people, but the improvements were offset by the war with China in 1937 and, more notably, by the entrance of the United States into the war in 1941. Japan had to muster all its own resources and those of its colonies, and good times soon turned into hard times for the Taiwanese farmer. At first, village men were lured off the land to work at high pay on Japanese construction projects, and others were conscripted to work in Japanese army labor gangs in both Taiwan and in Southeast Asia. Often families were left with only the women, children, and old men to work the land. The supply of artificial fertilizer which had been so important in developing intensive rice cultivation was almost completely cut off. The little food that could be produced under these difficult conditions was usually confiscated by the Japanese authorities to supplement the food supplies in Japan, and villagers were frequently reduced to a diet consisting mostly of sweet potatoes. The gratitude they had felt for the prewar accomplishments of the Japanese was offset by the severity of Japanese rule during the hard war years.

The defeat of the Japanese and the coming of the Chinese National-

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Changing Land Tenure and Its Effect on Community Organization

The traditional (Ch'ing) land tenure system in Taiwan has undergone a number of modifications over the years. Each was instituted with the advent of a new regime, and marked the inception of major changes in other aspects of rural life. As we have seen, the colonial administration policies of the Japanese were instrumental in producing the first significant involvement of the Taiwanese peasant in the market economy. Nevertheless, it was not until the restoration of Chinese rule, when the population growth began to exert noticeable pressures and the Nationalist Chinese sponsored the Land Reform Program, that major changes took place in the economy which reached directly into most of the areas of Taiwanese rural life.

The system of land tenure in Taiwan has always been a controlling factor in the lives of the agricultural population, and to understand Taiwanese life fully it is necessary to understand the land tenure system and its history. From the late nineteenth century onwards the rural villagers suffered the results of the concentration of landownership into too few hands. This situation culminated finally in the Land Reform Program of 1949-1953, which, for the first time, secured the Taiwanese tenants' rights to the land they tilled through firm rental contracts, reductions in rent, and the Land-to-the-Tiller Program.

Putting untitled land under cultivation became a great concern of the government at the time of the Manchu conquest of Taiwan in 1683, according to Tang (1954:23-27). Under the Manchu (Ch'ing) dynasty, any person applying for rights to occupy uncultivated land was considered the owner as long as he kept his acres under proper cultivation. Not surprisingly, this program led to a situation in which people with enough capital, "a relatively small number of great families" (Ginsburg, 1953:32), obtained rights to large amounts of land

1:Gallin E-4,5 (1957-1958) 1966
AD5 Taiwan Hokkien
Formosa AD1
Taiwan AD6

CHANGING LAND TENURE

and then hired other people, usually immigrants from the mainland, to cultivate the land for them as their tenants.

As the population increased in the later years of the Ch'ing administration there was increasing pressure on the land, and many tenants began to sublease part of the land to others. These subtenants became the lowest rank in a three-stage hierarchal structure of land tenure (Ginsburg, 1953:26-27, 32-33; Grajdanzev, 1942:72-84; T'ang, 1954:23-27).

In 1904, nine years after taking control of Taiwan, the Japanese government altered this hierarchal system of land tenure by buying out the original landowner and conferring the rights of ownership on the tenant. When, in 1923, the Japanese applied the Japanese Civil Code to Taiwan, full legal rights were given to the new owner (the former tenant), who was now officially known as "landlord."

This move benefited the original tenant who was given full ownership rights, but it did nothing to improve the lot of the mass of actual cultivators (now tenants instead of subtenants) whose land rent was no lower than before. As a result, "tenancy disputes" became more numerous beginning in 1927. In that year the Japanese authorities encouraged the formation of local associations of landowners and tenants which were charged with the responsibilities of promoting better relations between landlord and tenant, preventing tenancy disputes, and fostering agricultural production (T'ang, 1954:26). Although many such associations were formed, "the question of farm rents was entirely outside of the jurisdiction of these associations. It [the rent question] was not only left unsolved, but there was even a marked tendency for farm rents to keep on increasing" (T'ang, 1954:26).

In 1939, in the midst of the Sino-Japanese war, the Japanese government issued a rent control law which was applicable to Taiwan and Japan alike. This law had little effect in Taiwan because it did nothing to reduce rents; it only stabilized the situation. (See Grajdanzev, 1942:72-84, especially p. 82 for a discussion of the Japanese attempts to deal with Taiwanese land tenure problems.)

Although the farm tenancy system continued, after 1945 the Japanese rent control law of 1939 was no longer enforced when Taiwan reverted to Chinese rule. With the increase in the rural population and the general upset of the island's economy, farm rents began to rise, and demands increasing security and rent deposits were made. Worst of all, in many cases tenants were arbitrarily evicted (T'ang, 1954:23-28).

Tenancy had been a great problem in Taiwan under both the Japanese and the Chinese since landownership was concentrated in the hands of relatively few owners (Klein, 1958:53; see also his Tables 17 and 18). "The high rate of tenancy reflects the great scarcity of cultivable land in Taiwan in relation to the demand for it. Land-

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